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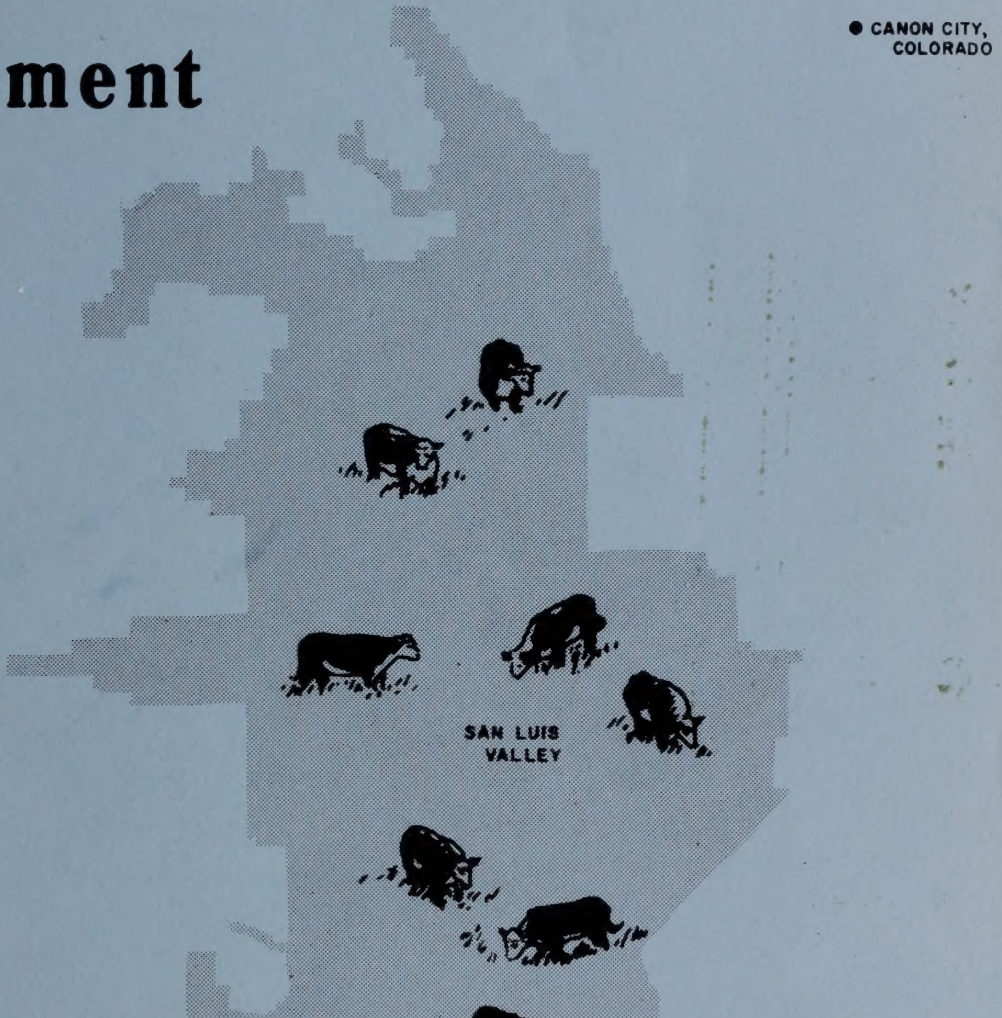

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DEPARTMENT OF THE INTERIOR

DRAFT

ENVIRONMENTAL STATEMENT

ON

GRAZING MANAGEMENT

IN THE

SAN LUIS RESOURCE AREA

PREPARED BY

BUREAU OF LAND MANAGEMENT

DEPARTMENT OF THE INTERIOR

Dale R Andrus

STATE DIRECTOR, COLORADO STATE OFFICE

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SUMMARY

(X) Draft ( ) Final Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: (X) Administrative ( ) Legislative

2. Brief Description of Action: The Bureau of Land Management proposes a grazing management program on national resource lands (NRL) in the San Luis Valley, located in south-central Colorado. The components of the proposal are (1) intensive management of grazing (allotment management plans or AMPs) on 473,916 acres; (2) custodial management of grazing on 16,625 acres; (3) elimination of grazing 5,930 acres; and (4) continuation of unallotted status of range on 19,900 acres. Construction of various range improvements would be required to implement the AMPs, and fencing would be required to eliminate grazing in some areas.

3. Summary of Environmental Impacts: Watershed conditions would improve overall. Production of vegetation would increase. Wildlife habitat would improve and big-game animals would increase. Declining aquatic and riparian communities would stabilize. That segment of the livestock industry dependent upon NRL would be stabilized. Expenditures on improvements would provide some benefits to an economically depressed area. In the event of infrequent, high-intensity storms, sediment yield would increase by 3 to 5 percent on AMPs receiving periodic, concentrated grazing during spring and summer. Spring-summer grazing would be temporarily harmful to vegetation when growth requirements were not met. Fencing would present obstacles to wildlife as well as public land users. All man-made structures would reduce the visual quality of the area.

4. Alternatives Considered:
    a. No action (continuation of present management)
    b. Elimination of grazing
    c. Custodial management
    d. Reduced management on specific allotments
    e. Wildlife effective
    f. Watershed effective
    g. Balanced multiple use

5. Comments will be requested from:
   See Attachment

6. Date Draft Statement Made Available to C.E.Q. and the Public:
   January 1977

ATTACHMENT

Comments on the draft environmental statement will be requested from the following agencies and interest groups.

Colorado State Agencies

- Governor's Clearing House
- Division of Wildlife

County Commissioners

- Alamosa County
- Conejos County
- Rio Grande County
- Saguache County

Environmental Protection Agency

Department of the Interior

- U.S. Fish and Wildlife Service
- Bureau of Reclamation
- Bureau of Outdoor Recreation
- U.S. Geological Survey
- Bureau of Mines
- National Park Service

Department of Agriculture

- Forest Service
- Soil Conservation Service

Department of Commerce

Other Organizations

- Sierra Club
- Colorado Open Space Council
- Izaak Walton League
- The Wildlife Society
- Colorado Stock Growers Association
- Colorado Wool Growers Association
- Audubon Society
- Natural Resource Defense Council
- Society of Range Management
- Wilderness Society
- Rocky Mountain Center on Environment
- Advisory Council on Historic Preservation
- Institute of Ecology

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CHAPTER I. DESCRIPTION OF THE PROPOSED ACTION

Description

The Bureau of Land Management (BLM), Canon City District, proposes a grazing management program for the San Luis Resource Area, located in south-central Colorado (figure I-1).* The proposal includes the following components: (1) the intensive management of grazing, which involves five systems of grazing--rest rotation, deferred rest rotation, deferred rotation, deferred, and season-long; (2) the elimination of livestock grazing; (3) the custodial management of grazing; and (4) the continuation of the unallotted status (lands not committed to livestock grazing) of some range. The development of range improvements, specifically water, fencing, and erosion-control developments, would be required to facilitate the implementation of intensive management and the development of fencing to facilitate the elimination of livestock grazing. The proposal components are discussed in detail on pages I-21 through I-81 of this statement.**

The proposal would involve 516,371 acres of national resource lands (NRL). In addition, national forest lands, national wildlife refuges, a national monument, and state and privately owned land would also be involved. Table I-1 shows the types and the amounts of land that would be affected by the proposal.

---

* The data provided in subsequent chapters of this statement apply predominantly to the San Luis Resource Area. At times, however, data that referred specifically to the resource area were not available. Consequently, statistics that cover the entire San Luis Valley were used.

** The glossary at the end of this statement provides definitions for many of the technical terms used throughout.

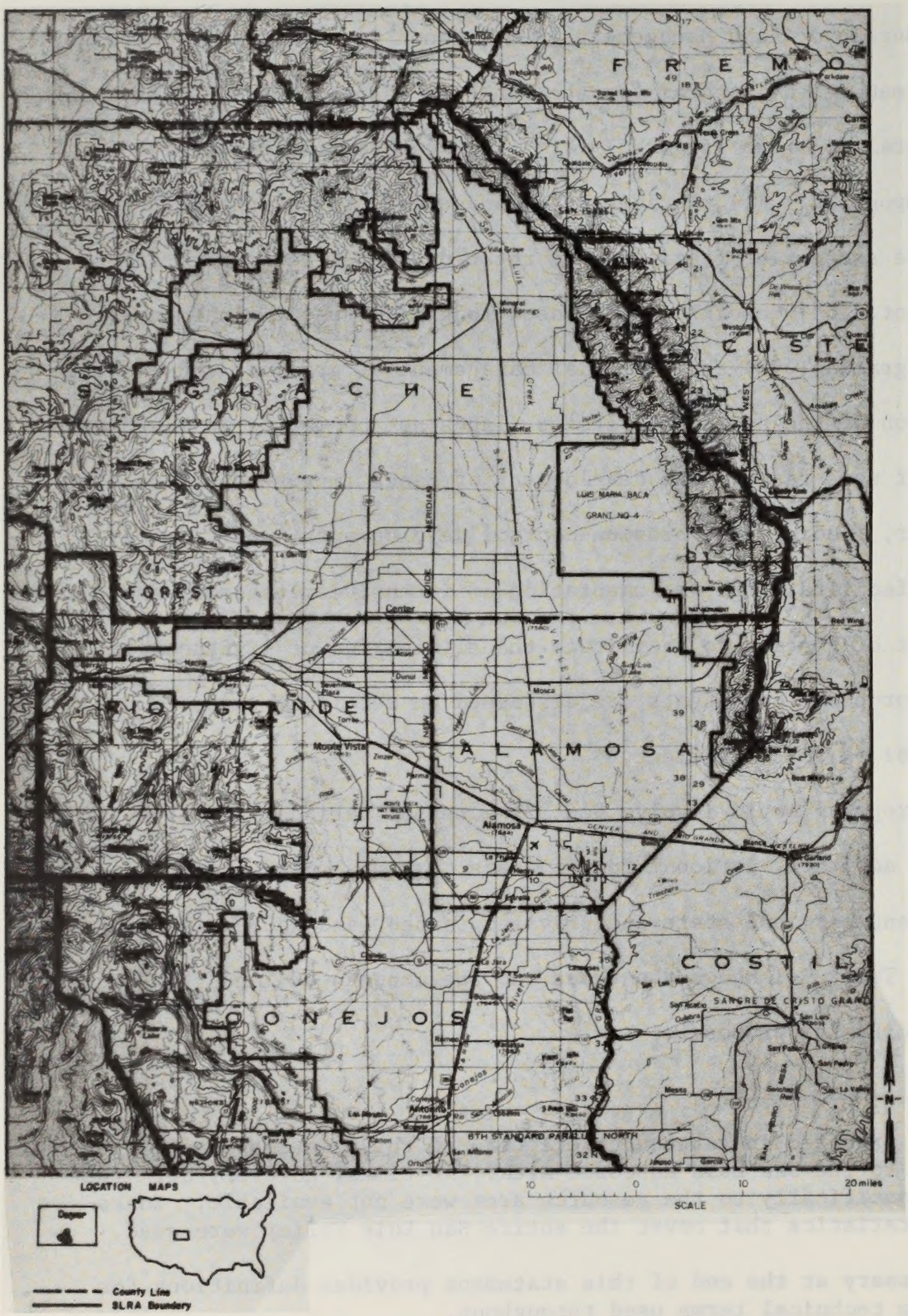

Figure I-1. Location of the San Luis Resource Area

TABLE I-1. LAND AFFECTED BY PROPOSAL
(in acres)

Proposed Action (Components)	National Resource Lands a/	State b/	Private c/	Uncontrolled d/
Intensive Management	473,916	31,540	42,464	20,437
Elimination of Grazing	5,930	--	--	--
Custodial Management	16,625	--	--	--
Unallotted Status of Range	19,900*	--	--	--
Total Acres	516,371			

a/ Land owned by the federal government and managed by the BLM

b/ Land owned by the State of Colorado which is fenced within the proposed allotment boundaries and leased to the range users (allottees)

c/ Land owned by the allottees which is fenced within the proposed allotment boundaries

d/ Land of various ownerships, including private, state, and other federally owned land (e.g., national forest lands), which is fenced within the allotment boundaries and not controlled with a lease or a deed by the allottee

* An estimated 5,700 acres of unallotted NRL have not been specifically identified on a tract by tract basis since these lands are scattered through the resource area and are too small to itemize individually.

The proposed action would be applied to 165 management units involving 110 livestock operators in the San Luis Resource Area. A management unit may include one or more separated parcels (tracts) of NRL. One hundred thirty-four (134) of these management units are allotments. An allotment is a unit of land designated for grazing by a prescribed number of cattle, sheep, or horses or by the combined use of these animals. The remaining 31 parcels would not be grazed by livestock. Figure I-2 is a map, enclosed in a packet that accompanies this statement, showing the specific boundaries of the management units.

Table I-2 shows the grazing management program proposed for each management unit in the San Luis Resource Area. The table also identifies the class of livestock, number of AUMs* contributed by NRL, season of use, type of grazing use, and the details related to any range improvements that would be needed to implement the management system. In summary, intensive grazing management would be applied to 95 management units (in the form of allotment management plans, explained on pages I-19 through I-23 of this statement), elimination of grazing to 9 (pages I-50 f.), custodial management to 39 units (page I-80, and unallotted status to 22 units (pages I-80 f.).

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* An animal unit month (AUM) equals the amount of feed or forage required by an animal unit, which is generally considered to be one mature cow with calf or their equivalent, for one month.

TABLE I-2. PROPOSED ACTION

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
1P Poncha Pass West 1,925 Ac. NRL	C-375 AUMs (180 AUM reduction)	6-1 to 8-31	Rest Rotation 3-pasture	3.1 mi. 3-wire Antelope Type 2 Cattleguards	.53 mi.	--	--	--	1	3
2E Arizona-Colorado 12,173 Ac. NRL										
East Side: 10,013 Ac. NRL	C-1,875 AUMs	6-15 to 10-15	Rest Rotation 4-pasture	--	--	--	--	--	--	--
Poncha Pass-East: 2,160 Ac. NRL	C-380 AUMs	6-20 to 9-5	Deferred Rotation 2-pasture	--	--	--	--	--	--	--
3C Round Hill 160 Ac. NRL	10 AUMs	--	Custodial							
4P West Clover Creek 160 Ac. NRL	C-45 AUMs (30 AUM reduction)	8-1 to 9-15 (Formerly 6-1/8-28)	Deferred 1-pasture	--	--	--	--	--	--	--
5C Clover Creek 120 Ac. NRL	5 AUMs	--	Custodial							
6C San Luis Creek #1 55 Ac. NRL	6 AUMs	--	Custodial							
7P Alder 1,349 Ac. NRL	C-133 AUMs	6-1 to 8-31	Season-long Summer	--	--	--	--	--	--	--
8C San Luis Creek #3 220 Ac. NRL	12 AUMs	--	Custodial							
9E Turquoise Gulch 3,806 Ac. NRL	C-539 AUMs	6-1 to 10-30	Deferred Rotation 3-pasture	--	--	--	--	--	--	--
10E Kelly Creek 6,699 Ac. NRL	C-566 AUMs	6-8 to 10-7	Rest Rotation 3-pasture	--	--	--	--	--	--	--
11P Kerber Creek 4,500 Ac. NRL	C-274 AUMs	6-25 to 9-24	Rest Rotation 5-pasture	19.5 mi. 3-wire Antelope Type	.75 mi.	--	--	1 Reservoir	--	2

* Key to type of proposed component indicated in management unit number:
E = Existing intensive management of grazing (AMP)
P = Proposed intensive management of grazing (AMP)
Eg = Elimination of grazing
C = Custodial management of grazing
U = Unallotted status of range

** Key to class of livestock: C-cattle; S-sheep; H-horses

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
12C South Kerber Creek 760 Ac. NRL	12 AUMs	--	Custodial							
13C North Kerber Creek 180 Ac. NRL	18 AUMs	--	Custodial							
14E Noland Gulch 7,650 Ac. NRL	C-541 AUMs	6-1 to 9-30	Rest Rotation 3-pasture	--	--	--	--	--	--	--
15P Nye 1,460 Ac. NRL	C-76 AUMs (14 AUM reduction)	7-6 to 9-21 (Formerly 6-22/9-21)	Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	16 Passes, .06 mi. ea. (.96 mi. Total) 3-wire Antelope Type	.75 mi. 1 Ease-ment	--	--	--	--	1
16P East & West San Luis Creek 2,740 Ac. NRL	C-262 AUMs	6-10 to 9-10	Deferred Rotation 3-pasture	4.2 mi. 3-wire Antelope Type 2 Cattleguards	.4 mi.	1	--	--	--	2
17C Section 35 Tract 160 Ac. NRL	20 AUMs	--	Custodial							
18C Junction 200 Ac. NRL	20 AUMs	--	Custodial							
19C Section 13 Tract 80 Ac. NRL	12 AUMs	--	Custodial							
20U Unallotted 280 Ac. NRL										
21C Silver Creek 200 Ac. NRL	8 AUMs	--	Custodial							
22P Piney Creek 2,510 Ac. NRL	C-171 AUMs	5-1 to 10-31	Deferred Rotation 2-pasture	1.5 mi. 3-wire Antelope Type	1.25 mi.	--	--	--	1	2
23P Steel Canyon 4,472 Ac. NRL	C-210 AUMs	6-1 to 9-30	Deferred Rotation 2-pasture	2.3 mi. 3-wire Antelope Type 1 Cattleguard	2.5 mi.	--	--	--	--	2
24P Mirage 2,395 Ac. NRL	C-187 AUMs	6-1 to 10-20	Deferred Rotation 2-pasture	1.5 mi. 3-wire Antelope Type	.8 mi.	--	--	--	--	2
25E Valley View Hot Springs 4,927 Ac. NRL	C-427 AUMs	6-22 to 10-22	Deferred Rotation 3-pasture	--	--	--	--	--	--	--

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
26Eg Garner Creek 240 Ac. NRL	30 AUMs	--	Elimination	2 mi. 3-wire Antelope Type	--	--	--	--	--	--
27Eg South 440 Ac. NRL	Incl'd/26Eg	--	Elimination							
28P Cotton Creek 3,880 Ac. NRL	C-312 AUMs	6-15 to 9-25	Rest Rotation 3-pasture	5.75 mi. 3-wire Antelope Type 2 Cattleguards	.75 mi.	--	--	--	--	1
29C Rito Alto 800 Ac. NRL	45 AUMs	--	Custodial							
30C San Isabel Creek 700 Ac. NRL	12 AUMs	--	Custodial							
31P Hutchinson 835 Ac. NRL	C-18 AUMs H-59 AUMs	6-1 to 2-28 9-16 to 10-15 (Formerly 3-1/2-28)	Rest Rotation 3-pasture	1 mi. 3-wire Antelope Type	1 mi. Easement for .25 mi.	--	--	--	--	2
32U Unallotted 40 Ac. NRL										
33U Unallotted 400 Ac. NRL										
34P Mineral Hot Springs 10,260 Ac. NRL (Formerly Werner, Crowe, Shooker, & Sturdevan)	C-1,030 AUMs	6-1 to 9-30	Rest Rotation 3-pasture	--	8 mi.	--	--	--	--	9
35U Unallotted 160 Ac. NRL										
36P McIntyre Gulch 4,602 Ac. NRL	C-311 AUMs	9-16 to 11-8	Deferred Rest Rotation 3-pasture	2 mi. 3-wire Antelope Type	--	--	--	--	2 Maint.	2
37U Unallotted 680 Ac. NRL										
38U Unallotted 400 Ac. NRL										
39P Findley Gulch 11,345 Ac. NRL	C-753 AUMs (374 AUM reduction)	7-16 to 10-10 (Formerly 6-15/2-20)	Rest Rotation 3-pasture	10 Passes, .06 mi. ea. (.6 mi. Total) 3-wire Antelope Type	13 mi.	1	--	--	1	15

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
40C Calvert Fenced F.R. 1,220 Ac. NRL	14 AUMs	--	Custodial							
41P Laughlin Gulch 6,643 Ac. NRL	C-453 AUMs	6-1 to 10-15 (Formerly 5-1/10-5)	Rest Rotation 3-pasture	1.3 mi. 3-wire Antelope Type .38 mi. Fence Removal. .75 mi. Fence Repair, Antelope Type.	1 mi.	--	--	--	1	2
42P Poison Gulch 14,357 Ac. NRL (Formerly Poison Gulch, East Hoagland, & Hill)	C-867 AUMs H-88 AUMs (29 AUM reduction)	6-1 to 10-15 (Formerly 5-1/9-30)	Rest Rotation 3-pasture	6.5 mi. 3-wire Antelope Type	.02 mi.	--	--	1 Earthen Reservoir 3 Check Dams	1	1
43C Ward Fenced Tract 60 Ac. NRL	18 AUMs	--	Custodial							
44C Indian Creek 120 Ac. NRL	7 AUMs	--	Custodial							
45P Cross Creek 6,305 Ac. NRL	C-301 AUMs	6-25 to 7-5 8-24 to 10-3	Rest Rotation 4-pasture 3-treatment	6.4 mi. 3-wire Antelope Type 3 Cattleguards 1 Easement for Water Gap	1.2 mi.	2	--	--	1	5
46P Trickle Mountain 19,562 Ac. NRL	C-776 AUMs (419 AUM reduction)	6-16 to 10-15	Rest Rotation 4-pasture	6.4 mi. 3-wire Antelope Type 1 Cattleguard	1.5 mi.	--	--	2 Catchments 2 Reservoirs 1 Check Dam	--	3
47P Sheep Creek 2,031 Ac. NRL	C-202 AUMs	9-5 to 9-30	Deferred 1-pasture	.75 mi. 3-wire Antelope Type	--	--	--	--	1 Redevelop	--
48P Taylor Canyon 2,902 Ac. NRL	C-245 AUMs	11-1 to 11-30 (Formerly 5-16/6-15)	Deferred 1-pasture	--	--	--	One 20,000 gal.	1 Reservoir	1 Redevelop	2
49C Meadow Fenced 330 Ac. NRL	20 AUMs	--	Custodial							
50P Rabbit Canyon 3,835 Ac. NRL (Combination of East-West Allotments)	C-292 AUMs	5-1 to 6-10 11-1 to 12-10	Deferred Rotation 2-pasture	--	2 mi.	--	One 30,000 gal.	5 Check Dams	--	2

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
51E Saguache Park 1,920 Ac. NRL	C-119 AUMs	6-1 to 10-15	Rest Rotation 8-pasture 4-treatment	--	--	--	--	--	--	--
52P Hat Springs 4,564 Ac. NRL	C-323 AUMs	10-15 to 11-30	Deferred 1-pasture	1.25 mi. 3-wire Antelope Type	1.5 mi.	--	--	--	1	2
53P Robb Ranch 1,488 Ac. NRL	C-113 AUMs	11-1 to 12-31	Deferred 1-pasture	--	--	--	--	--	--	--
54C Mesa 960 Ac. NRL	20 AUMs	--	Custodial							
55P Mill Hill 4,167 Ac. NRL (Formerly Mill Hill & Hoagland)	C-263 AUMs	6-15 to 10-15	Rest Rotation 3-pasture	3 mi. 3-wire Antelope Type	3 mi.	1	--	--	--	4
56P Higgins Spring 753 Ac. NRL	C-49 AUMs	7-5 to 10-5	Rest Rotation 2-pasture	.5 mi. 3-wire Antelope Type	--	--	--	1 Earthen Reservoir	1	2
57P Mitchell 938 Ac. NRL	C-25 AUMs (26 AUM reduction)	10-15 to 11-14 (Formerly 7-15/9-14)	Deferred Rest Rotation 1-pasture 2 yrs. Rest 1 year.	--	--	--	--	--	--	--
58P West Tracy Ridge 925 Ac. NRL	C-48 AUMs (34 AUM reduction)	8-1 to 10-31 (Formerly 6-1/9-30)	Rest Rotation 1-pasture 3 yrs. rest 1 yr. graze	--	--	--	--	--	1 Maint.	--
59P Tracy Ridge 893 Ac. NRL	C-45 AUMs	9-1 to 10-31 (Formerly 6-1/9-30)	Deferred 2-pasture, used as 1	--	--	--	--	--	--	--
60P Tracy Cattlemen's 27,749 Ac. NRL	C-2,420 AUMs S-427 AUMs	6-16 to 10-15 11-8 to 1-25	Rest Rotation 3-pasture	12.5 mi. 3-wire Antelope Type 4 Cattleguards	7.6 mi.	--	--	--	--	6
61P Tracy Individual 1,676 Ac. NRL	C-100 AUMs	8-5 to 10-5 (Formerly 6-15/10-15)	Deferred 1-pasture	--	--	--	--	--	--	--
62U Unallotted 1,500 Ac. NRL										

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
63P Biedell Creek 2,462 Ac. NRL	C-172 AUMs	7-1 to 10-15	Rest Rotation 3-pasture	2.6 mi. 3-wire Antelope Type 2 Cattleguards	.4 mi.	--	--	1 Earthen Reservoir	1	3
64P East of Carnero Creek 11,849 Ac. NRL	C-630 AUMs (Formerly Sheep)	6-16 to 10-15 (Formerly 10-25/2-28)	Rest Rotation 4-pasture	12 mi. 3-wire Antelope Type 2 Cattleguards	4.4 mi.	--	--	3 Reservoirs	3	8
65P Upper Coolbroth 1,780 Ac. NRL	C-74 AUMs (44 AUM reduction)	8-1 to 8-31 (Formerly 7-1/8-31)	Deferred 1-pasture	--	--	--	--	--	--	--
66P Lower Coolbroth 605 Ac. NRL	C-29 AUMs	8-16 to 9-15 (Formerly 9-1/10-30)	Deferred 1-pasture	--	--	--	--	--	--	--
67P Carnero Creek 2,318 Ac. NRL	S-104 AUMs	10-1 to 10-26	Deferred 1-pasture	--	--	--	--	--	--	--
68P La Garita 1,082 Ac. NRL	S-73 AUMs	10-16 to 11-11	Deferred 1-pasture	--	--	--	--	--	--	--
69P Elephant Rocks 3,517 Ac. NRL	S-93 AUMs (107 AUM reduction)	11-17 to 11-17 11-18 to 11-26	Deferred 1-pasture Deferred Rotation 2-pasture	Boundary Markers 55 Steel Posts	--	--	--	--	--	--
70P Rio Grande Canal 4,360 Ac. NRL	S-225 AUMs	6-15 to 6-30 11-1 to 11-28 (Formerly 11-7/11-28)	Rest Rotation 3-pasture	Boundary Markers 60 Steel Posts	3 mi.	1	One 10,000 gal.	--	--	4
71C Indian Head 800 Ac. NRL	28 AUMs	--	Custodial							
72C County Line 200 Ac. NRL	18 AUMs	--	Custodial							
73P Alder Creek 275 Ac. NRL	C-20 AUMs	5-20 to 6-19 10-1 to 10-30 (Formerly 5-20/6-19)	Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	--	.5 mi. 1 pump	--	--	--	--	1
74Eg Masonic Park 400 Ac. NRL	22 AUMs		Elimination							
75C Shaw Creek 640 Ac. NRL	44 AUMs	--	Custodial							

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
76P Sanderson 510 Ac. NRL	C-32 AUMs	6-8 to 6-20	Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	--	.75 mi. Easement for .25 mi.	--	--	--	1	1
77P Bowen 488 Ac. NRL	C-21 AUMs (11 AUM reduction)	9-15 to 10-9 (Formerly 9-15/11-12)	Deferred 1-pasture	--	--	--	--	--	--	--
78P Schrader Creek 640 Ac. NRL	C-42 AUMs	9-15 to 10-5 (Formerly 5-26/6-15)	Deferred 1-pasture	--	--	--	--	--	--	--
79P Branch 2,457 Ac. NRL	C-143 AUMs (48 AUM reduction)	8-15 to 10-14 (Formerly 6-1/7-31, 10-15/12-15)	Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	3.5 mi. 3-wire Antelope Type 4.5 mi. Repair Antelope Type	--	--	Two 10,000 gal.	--	--	2
80P Pup Peak 5,002 Ac. NRL	S-404 AUMs	10-25 to 1-11	Deferred Rest Rotation 4-pasture	Boundary Markers 200 Steel Posts 27 Passes, .06 mi. ea. (1.6 mi. Total) 3-wire Antelope Type	6 mi.	--	One 10,000 gal.	12 Check Dams	--	8
81P Limekiln 5,050 Ac. NRL	S-370 AUMs	12-1 to 2-14	Deferred Rest Rotation 4-pasture	Boundary Markers 200 Steel Posts	4.5 mi.	1	One 10,000 gal. One 16,000 gal.	10 Check Dams Reconstruct 1 Earthen Reservoir	--	10
82P Nicomodes 3,080 Ac. NRL	S-304 AUMs	5-1 to 6-20 11-27 to 1-13 (Formerly 6-1/6-20, 11-27/1-22)	Rest Rotation 3-pasture	1.75 mi. 3-wire Antelope Type Boundary Markers 20 Steel Posts 8 Passes, .06 mi. ea. (.48 mi. Total) 3-wire Antelope Type	2 mi.	--	--	5 Check Dams	--	2
83P Raton Creek 3,940 Ac. NRL	C-387 AUMs	7-1 to 9-30	Rest Rotation 3-pasture	1.75 mi. 3-wire Antelope Type	1.5 mi.	--	--	--	1	1

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
84P Rock Creek 12,680 Ac. NRL	S-1,147 AUMs	8-1 to 10-4 (Formerly 10-1/12-4)	Rest Rotation 5-pasture	Boundary Markers 200 Steel Posts	9.5 mi. Easement for .75 mi.	2	Two 10,000 gal.	3 Earthen Reservoirs 10 Check Dams	1	8
85P McMahon 15,016 Ac. NRL (Formerly Getz, Gato, Chiquita Park, & Alamosa)	S-1,287 AUMs (23 AUM reduction)	6-12 to 7-20 10-1 to 12-5	Rest Rotation 3-pasture	Boundary Markers 150 Steel Posts	1.75 mi.	--	--	--	1	2
86P Greenie Mountain 8,114 Ac. NRL	S-598 AUMs (122 AUM reduction)	5-4 to 7-5 10-1 to 11-30 (Formerly Fall & Winter)	Rest Rotation 3-pasture	Boundary Markers 500 Steel Posts	2.25 mi.	1	One 10,000 gal.	--	--	3
87P Gato-Hutchinson 1,960 Ac. NRL	S-228 AUMs	11-1 to 12-15 (Formerly 1-9/2-23)	Deferred Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	Boundary Markers 300 Steel Posts	--	--	--	Bentonite in 1 Reservoir	--	--
88P Triangle 3,715 Ac. NRL	S-315 AUMs	11-1 to 12-29	Deferred Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	Boundary Markers 100 Steel Posts	--	--	--	Bentonite in 1 Reservoir	--	--
89P Alamosa River 760 Ac. NRL	S-40 AUMs	11-10 to 11-29	Deferred Rest Rotation 1-pasture 3 yrs. Graze 1 yr. Rest	Boundary Markers 30 Steel Posts	--	--	--	--	--	--
90C Alamosa Prairie 320 Ac. NRL	11 AUMs	--	Custodial							
91U Unallotted 360 Ac. NRL										
92C Chicago Bogs 520 Ac. NRL	52 AUMs	--	Custodial							
93P Posito Creek 4,991 Ac. NRL	C-350 AUMs	6-15 to 9-30	Rest Rotation 3-pasture	4.75 mi. 3-wire Antelope Type	2.75 mi.	--	--	1 Earthen Reservoir	--	2
94P Jadero Flat 5,200 Ac. NRL	S-322 AUMs	12-15 to 3-23	Deferred Rest Rotation 3-pasture	Boundary Markers 20 Steel Posts	--	--	--	--	--	--

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
95P Poso Creek 2,240 Ac. NRL	S-206 AUMs	12-15 to 1-27 (Formerly 12-1/12-30)	Deferred Rest Rotation 3-pasture	Boundary Markers 25 Steel Posts	--	--	--	--	--	--
96P Capulin 5,589 Ac. NRL (Combined Prairie and Capulin)	S-587 AUMs	9-25 to 1-14 (Formerly 6-10/9-25, 10-22/12-2)	Deferred Rest Rotation 3-pasture	Boundary Markers 30 Steel Posts	2.5 mi.	1	--	--	--	3
97P Romero Canyon 1,730 Ac. NRL	C-127 AUMs	7-16 to 9-5	Deferred Rotation 2-pasture	1.75 mi. Antelope Type	--	--	--	2 Earthen Reservoirs	--	--
98P Ra Jadero Canyon 6,730 Ac. NRL (Formerly La Jara Canyon, Ra Jadero Canyon, & Pasture)	C-621 AUMs (Formerly Sheep)	6-1 to 10-15 (Formerly Summer, Fall, & Winter)	Rest Rotation 3-pasture	20 mi. 3-wire Antelope Type 2 Cattleguards	3.5 mi.	--	--	1 Water Catchment 4 Earthen Reservoirs	1	4
99P Cinder Pits 15,370 Ac. NRL (Formerly Crossroads, Garam Buyo, Gasline, La Jara Creek, & Trujillo)	C-1,160 AUMs	9-1 to 10-31 (Formerly 8-25/2-28)	Deferred Rest Rotation 3-pasture	19 mi. 3-wire Antelope Type	11 mi.	1	One 20,000 gal. One 85,000 gal.	Repair & Seal with Bentonite 2 Existing Reservoirs; 1 Water Catchment	--	12
100E Ciscom Flat 3,680 Ac. NRL	C-192 AUMs	6-5 to 10-15	Rest Rotation 4-pasture	--	--	--	--	--	--	--
101U Hot Creek 4,520 Ac. NRL			Unallotted							
102P La Jara Creek 820 Ac. NRL	C-40 AUMs (39 AUM reduction)	8-1 to 9-30 8-15 to 10-14 (Formerly 6-1/9-30)	Rest Rotation 1-pasture 3 yrs. Graze 1 yr. Rest	--	--	--	--	--	--	--
103C Del Rancho 160 Ac. NRL	12 AUMs	--	Custodial							
104Eg La Jara Canyon 275 Ac. NRL	18 AUMs	--	Elimination							
105Eg Pastures 370 Ac. NRL	21 AUMs	--	Elimination							
106P Little Mogotes 13,510 Ac. NRL (Formerly Goshawk, Hawkins, Hilltop, & Pasture)	C-724 AUMs S-720 AUMs	5-16 to 6-10 10-1 to 1-21	Rest Rotation 3-pasture	24 mi. 3-wire Antelope Type	12 mi.	1	One 20,000 gal.	2 Catchments 2 Earthen Reservoirs	--	14

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
107P Grande 3,950 Ac. NRL	S-436 AUMs (28 AUM reduction)	5-20 to 6-19 10-1 to 10-15 (Formerly 5-16 to 6-20, 10-1 to 10-15)	Rest Rotation 3-pasture	Boundary Markers 30 Steel Posts	--	--	--	Repair & Seal with Bentonite 3 Existing Reservoirs	--	--
108P Mogote Flat 1,977 Ac. NRL	S-206 AUMs	6-1 to 6-29 10-1 to 11-10	Deferred Rotation 2-pasture	Boundary Markers 203 Steel Posts	--	--	--	1 Reservoir	--	--
109P Poso 5,240 Ac. NRL	C-276 AUMs (Formerly Sheep)	6-1 to 6-30 9-15 to 10-14 (Formerly 10-18/10-31, 11-25/1-21)	Deferred Rotation 2-pasture	4.5 mi. 3-wire Antelope Type	6 mi.	1	One 20,000 gal.	1 Earthen Reservoir	--	3
110P Los Mogotes 7,514 Ac. NRL (Formerly Mesitas, Fox Creek, Mogote Peaks, Guadalupe, & Highway Peaks)	C-652 AUMs (Formerly Sheep)	6-1 to 9-30 (Formerly 3-1/2-28)	Rest Rotation 3-pasture	12.5 mi. 3-wire Antelope Type	--	--	--	Seal 4 Existing Reservoirs with Bentonite 4 Reservoirs	--	--
111P Big Horn Creek 760 Ac. NRL	C-88 AUMs	4-8 to 5-10 11-1 to 12-3	Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	2 mi. 3-wire Antelope Type	--	--	--	--	--	--
112P Railroad 3,741 Ac. NRL	S-159 AUMs (52 AUM reduction	12-1 to 12-31 (Formerly 3-1/3-23, 12-1/12-31)	Deferred Rest Rotation 3-pasture	Boundary Markers 60 Steel Posts	.02 mi.	--	--	--	--	--
113P Llano 5,261 Ac. NRL (Formerly Taos, El Coda, & Ortiz)	S-150 AUMs (178 AUM reduction)	12-15 to 1-14 (Formerly some March & June Use)	Deferred Rest Rotation 3-pasture	Boundary Markers 50 Steel Posts	--	--	--	--	--	--
114U Unallotted 480 Ac. NRL										
115P Alta Lake 11,446 Ac. NRL (Formerly San Antonio, South Hills, & Alta Lake)	C-500 AUMs S-75 AUMs	12-1 to 2-28 1-2 to 1-16	Deferred Rest Rotation 4-pasture	5.5 mi. 3-wire 20 Passes, .06 mi. ea. (1.2 mi. Total) 3-wire Antelope Type	10 mi.	2	Two 10,000 gal.	--	--	9
116E Twin Lakes 8,153 Ac. NRL	C-653 AUMs	4-16 to 5-10 1-1 to 2-14	Deferred Rest Rotation 4-pasture	--	--	--	--	--	--	--

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
117P River 2,324 Ac. NRL	C-200 AUMs	11-1 to 12-31	Deferred Rest Rotation 3-pasture	2.7 mi. 3-wire Antelope Type	1.75 mi.	--	--	--	--	3
118Eg Mondragon Individual 385 Ac. NRL	4 AUMs	--	Elimination	2 mi. 3-wire Antelope Type	--	--	--	--	--	--
119P South Valley 1,800 Ac. NRL	C-136 AUMs	12-1 to 2-8	Deferred Rest Rotation 1-pasture 2 yrs. Graze 1 yr. Rest	--	.5 mi.	--	--	2 Reservoirs	--	3
120P Pinon 7,210 Ac. NRL	S-393 AUMs	5-15 to 7-15 10-15 to 2-28 (Formerly 3-1/3-10, 5-22/7-17, 9-15/9-25, 10-25/2-28)	Rest Rotation 4-pasture	Boundary Markers 30 Steel Posts 3 mi. 3-wire Antelope Type	5 mi. Easement for 2 mi.	1	One 10,000 gal.	--	--	4
121E Kiowa Hills 4,302 Ac. NRL	C-208 AUMs	5-16 to 6-15 10-10 to 11-9	Rest Rotation 3-pasture	--	--	--	--	--	--	--
122P Braiden 960 Ac. NRL	C-60 AUMs	10-1 to 11-13	Deferred Rest Rotation 2-pasture	--	--	--	--	--	--	--
123P Eight Mile 5,640 Ac. NRL	C-212 AUMs	10-17 to 1-15	Deferred Rest Rotation 3-pasture	8 mi. 3-wire Antelope Type 26 Passes, .06 mi. ea. (1.6 mi. Total) 3-wire Antelope Type	4 mi.		One 100,000 gal.	Bentonite 2 Existing Reservoirs	--	5
124P Pinon Hills 9,274 Ac. NRL	S-391 AUMs (109 AUM reduction)	10-1 to 2-28	Deferred Rest Rotation 3-pasture	Boundary Markers 30 Steel Posts	--	--	--	--	--	1
125P Rio Grande Common 18,611 Ac. NRL (Formerly Mesa Common, San Luis Hills, Flat Top, Fairy Hills, & East Bend)	C-557 AUMs S-281 AUMs (109 AUM reduction)	10-15 to 1-15	Deferred Rest Rotation 3-pasture	30 mi. 3-wire Antelope Type Remove 4 mi. for salvage	8 mi.	2	Three 100,000 gal.	Repair & Seal with Bentonite 2 Earthen Reservoirs	1	6

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
126P La Sauses 3,200 Ac. NRL	C-128 AUMs (13 AUM reduction)	9-22 to 11-25	Deferred Rest Rotation 3-pasture	2.5 mi. 3-wire Antelope Type 40 Passes, .06 mi. ea. (2.4 mi. Total) 3-wire Antelope Type	3 mi.	--	--	--	--	4
127Eg Saddleback Mountain 2,720 Ac. NRL	32 AUMs	--	Elimination	.25 mi. 3-wire Antelope Type 1 Cattleguard	--	--	--	--	--	--
128C Oxbow 120 Ac. NRL	8 AUMs	--	Custodial							
129P Rio Grande 2,975 Ac. NRL (Formerly Common & A)	C-98 AUMs	6-1 to 8-10	Deferred Rotation 2-pasture	3.25 mi. 3-wire Antelope Type Cattleguards: 1 new, 1 repair	1.5 mi.	1	--	--	--	2
130C Allotment B 160 Ac. NRL	3 AUMs	--	Custodial							
131U Emperius 160 Ac. NRL			Unallotted							
132P Four Mile 320 Ac. NRL	C-18 AUMs	8-1 to 9-30 (Formerly 7-1/7-15)	Deferred 1-pasture	Repair 3 mi. 3-wire Antelope Type	--	--	--	--	--	--
133P Tobin Creek 6,126 Ac. NRL (Formerly Tobin Creek, Holbrook, & Highway)	H-235 AUMs	10-1 to 2-28	Deferred Rotation 2-pasture	8.25 mi. (6.5 mi. repair work) 1 Cattleguard	.5 mi.	1	--	--	1	2
134P Foothills 4,700 Ac. NRL	C-257 AUMs (22 AUM reduction)	5-1 to 10-31 (Formerly 4-1/11-30)	Deferred Rotation 2-pasture	2.5 mi. 3-wire Antelope Type	2.3 mi.	--	--	--	3	5
135C Dow Pasture 480 Ac. NRL	14 AUMs	--	Custodial							
136C Phiffer Pasture 160 Ac. NRL	4 AUMs	--	Custodial							
137P Blanca 5,220 Ac. NRL	C-48 AUMs (245 AUM reduction)	8-1 to 9-30	Rest Rotation 5-pasture	6.5 mi. 1-wire Electric Fence .5 mi. 3-wire Antelope Type	.5 mi.	--	--	--	--	4

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
138P Dry Lakes 5,836 Ac. NRL (Formerly Lakes & Dry Lakes)	C-139 AUMs	9-1 to 11-30 (Formerly 6-21/7-26)	Deferred Rest Rotation 3-pasture	2.5 mi. 3-wire Antelope Type	.2 mi.	1	--	--	--	5
139C Caldwell Pasture 280 Ac. NRL	13 AUMs	--	Custodial							
140Eg Park Pasture 400 Ac. NRL	12 AUMs	--	Elimination	1.25 mi. 3-wire Antelope Type	--	--	--	--	--	--
141P Zapata Falls 5,991 Ac. NRL (Formerly Windmill, Pinon, Hampton, & Hill)	C-245 AUMs (50 AUM reduction)	5-1 to 6-10 9-10 to 10-24	Deferred Rotation 2-pasture	3.5 mi. 3-wire Antelope Type	1 mi.	--	--	--	--	1
142C Bachelor Lake 320 Ac. NRL	24 AUMs	--	Custodial							
143C Spring Pasture 600 Ac. NRL	10 AUMs	--	Custodial							
144C Sand Pasture 280 Ac. NRL	10 AUMs	--	Custodial							
145C Crow Pasture 1,040 Ac. NRL	40 AUMs	--	Custodial							
146C Section 15 Lease 240 Ac. NRL	8 AUMs	--	Custodial							
147C Section 15 Lease 140 Ac. NRL	7 AUMs	--	Custodial							
148Eg North Pasture 700 Ac. NRL	40 AUMs	--	Elimination							
149U Unallotted 200 Ac. NRL										
150C Dry Lakes 800 Ac. NRL	4 AUMs	--	Custodial							
151U Unallotted 1,680 Ac. NRL										
152U Unallotted 80 Ac. NRL										
153U Unallotted 600 Ac. NRL										

TABLE I-2. PROPOSED ACTION (cont.)

Grazing Management				Needed Range Improvements						
Management Unit & Acreage*	Class of Livestock** & AUMs	Season of Use	Type of Grazing Use	Fences & Cattleguards	Pipe-line	Wells	Storage Tanks	Catchments, Reservoirs, & Check Dams	Springs	Watering Troughs
154U Unallotted 80 Ac. NRL										
155U Unallotted 80 Ac. NRL										
156U Unallotted 80 Ac. NRL										
157U Unallotted 360 Ac. NRL										
158U Unallotted 80 Ac. NRL										
159E Klondyke 1,169 Ac. NRL	C-47 AUMs	6-21 to 9-25	Rest Rotation 5-pasture	--	--	--	--	--	--	--
160C Phone Line 800 Ac. NRL	24 AUMs	--	Custodial							
161C Big East 1,440 Ac. NRL	40 AUMs	--	Custodial							
162C Hellgate 800 Ac. NRL	29 AUMs	--	Custodial							
163C Sheep Trail 280 Ac. NRL	11 AUMs	--	Custodial							
164U Terrace Lakes 600 Ac. NRL			Unallotted							
165U Bonanza 1,380 Ac. NRL	29 AUMs		Unallotted							

Purpose and Need

The purpose of the proposed action is to maintain or improve the renewable resources of NRL--soil, water, vegetation, and wildlife--through the use of grazing management. As required by law (the Taylor Grazing Act, 1934, and the Classification and Multiple Use Act, Public Law 88-607 enacted in 1964), the Bureau needs to provide a sustained yield of forage for wildlife and livestock and at the same time improve the watershed in order to reduce sediment yield. Table I-3 shows the estimated numbers of wildlife and livestock for which forage would be provided with the implementation of the proposed action.

TABLE I-3. ESTIMATED NUMBERS OF WILDLIFE AND LIVESTOCK

Animal	Number a/	Season of Use b/
Antelope	1,145	Yearlong
Bighorn Sheep	250	Various (Ave. 9 months)
Cattle	12,701*	Various
Deer	4,500	Various (Ave. 5 months)
Domestic Horses	76*	Various
Elk	2,600	Various (Ave. 3 months)
Sheep	31,927*	Various

a/ Wildlife numbers are estimates made by the Colorado Division of Wildlife and BLM personnel.

b/ Variations in seasons of use are due to vast ranges in elevation throughout the resource area. Animals can be located on some portions of NRL regardless of the season.

* In terms of AUMs for livestock use, 34,622 AUMs would be the stocking level of the proposed action, which is a reduction of 373 AUMs from the 1975 stocking level (see table I-2, pp.I-5 f., for proposed stocking levels (including reductions) by allotment).

Components of the Proposal

Intensive Management of Grazing

Intensive grazing management would be directly applied to 95 allotments within the San Luis Resource Area, affecting 473,916 acres of NRL and 33,943 animal unit months (AUMs). This type of management would be implemented by the Bureau through its Allotment Management Plan (AMP) Program. Of the 95 AMPs analyzed in this statement, 10 have already been implemented and 85 are proposed for implementation.* Of the ten existing AMPs, seven have been in effect for periods up to ten years and the other three were implemented in fiscal year 1975. The Bureau proposes to continue these existing AMPs without change. Implementation of intensive grazing management would include increased supervision of NRL.

An AMP is a livestock grazing plan dealing with a specific unit of range, providing a specific management program that considers livestock grazing in relation to other uses of the range and other renewable resource values--soil, water, vegetation, and wildlife. An AMP establishes the seasons of use, the number of domestic animals that would be allowed on the range, and the possible range improvements that would be needed, such as fencing and water development. The following steps were used in the preparation of AMPs.

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* Allotment Management Plans (AMPs) and their respective benefit-cost analyses are on file in the Canon City District Office and at the San Luis Resource Area Office in Alamosa, Colorado.

1. Review the bureau planning data, collect and analyze additional resource data (e.g. soils, water, vegetation, wildlife) and contact range users.

2. Identify resource problems (e.g. winter grazing by livestock on crucial winter range for deer).

3. Establish objectives that would enhance the resource and/or resolve resource problems (table I-4, pp.I-24 f. identifies specific objectives of the 95 AMPs).

4. Develop a grazing system that would accomplish the objectives.

5. Establish the location for range improvements required for implementing the grazing system.

6. Develop evaluation procedures and conduct studies to determine the effects of each grazing system.

As noted in the preceding list (step 6), evaluation procedures are built into each AMP. An AMP would be evaluated at the conclusion of each grazing cycle through various study procedures that would monitor the changes in plant composition and ground cover. Four studies are basic to the evaluation: actual grazing use, vegetative utilization, condition and trend (soils and vegetation), and climate (see Bureau Manual 4412.2 for detailed descriptions of these studies). In addition, data on wildlife habitat utilization and trends and hydrologic response studies would be collected if pertinent to the resource values of the allotment. For example, objectives for wildlife would be established and then the achievement of these objectives would be evaluated by monitoring forage utilization and estimating hunting harvests.

If the evaluation procedures determine that the specific objectives established for the allotments are not being achieved, modifications of the grazing systems would be made. Such modifications (revisions) may include changes in the following: the grazing system, amount of use (livestock numbers), season of use, and/or any conbination of these which would be deemed necessary to affect the objectives. Any grazing system would be subject to modification at any time if a deterioration in the resources on an allotment were apparent. If any modifications are needed, an environmental analysis record (EAR) would be completed prior to implementation of the revised plan. - Who ~~[illegible]~~ makes modif - Area mgr + necessary ~~Stat~~ Dist Staff

AMP - Any graz-ing system

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
1P Poncha Pass-West	Maintain present 10%-15% big sagebrush cover for wildlife.	Increase ground cover from 20% to 35%. Reduce erosion class from "Moderate-Slight" to "Stable."	--	Maintain forage production for cattle at 375 AUMs.	Increase crested wheatgrass from 20% to 30%.
2E Arizona-Colorado					
Poncha Pass-East:	Maintain present wildlife habitat.	Increase gound cover on all seeded areas to 25%.	--	Increase livestock forage production from 429 AUMs to 625 AUMs.	Increase pine needlegrass from 21% to 30%. Monitor western wheatgrass and crested wheatgrass.
East Side:	Maintain present wildlife habitat.	Increase ground cover on all seeded areas to 25%.	--	Increase livestock production as follows-- Commanche seeding: 525 AUMs to 666 AUMs; Native seeding: 2,025 AUMs to 2,600 AUMs.	Increase western wheatgrass and needle-and-thread from 22% to 35%. Monitor crested wheatgrass and Russian wildrye.
4P West Clover Creek	Maintain at least 5% canopy cover of big sage for wildlife.	Increase ground cover from 20% to 35%.	--	Maintain forage production for cattle at 45 AUMs.	Increase crested wheatgrass from 20% to 30%. Monitor western wheatgrass and pine needlegrass.
7P Alder	Maintain shrub composition at 21% of total. Reserve 90% of current annual growth of mountain mahogany for big game.	Maintain present "Slight" erosion condition class.	--	Maintain forage production for cattle at 133 AUMs.	Monitor crested wheatgrass, western wheatgrass, mountain mahogany, and scarlet globemallow.
9E Turquoise Gulch	Maintain habitat for 30 antelope for 9 months and 30 deer and 20 elk during winter.	--	--	Increase forage production for cattle from 539 AUMs to 845 AUMs.	Monitor needle-and-thread.

* Key to Allotment Number: P = Proposed AMP, E = Existing AMP.

** Erosion Condition Class. The following expressions and numerical ratings are used for the current erosion activity: Stable = 0-20; Slight = 21-40; Moderate = 41-60; Critical = 61-80; Severe = 81-100. Seven categories of surface features (soil movement, surface litter, surface rock, pedestalling, rills, flow patterns, and gullies), each having a numerical rating, were used to determine the BLM rating system for current erosion activity.

-- No specific objective for this resource was identified in AMPs.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
10E Kelly Creek	--	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 30%.	--	Maintain forage production for cattle at 603 AUMs.	Increase western wheatgrass and needle-and-thread from 3%-5% to 20%.
11P Kerber Creek	Reserve 90% annual growth of mountain mahogany for deer.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 20%.	--	Maintain forage production for cattle at 274 AUMs.	Maintain Arizona fescue at 33% of species composition. Increase western wheatgrass from 3% to 20%.
14E Noland Gulch	Maintain mountain mahogany at 3% to 5% and reserve 90% annual growth for deer and elk.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 30%.	--	Maintain forage production for cattle at 541 AUMs.	Increase western wheatgrass and needle-and-thread from 1%-5% to 20%.
15P Nye	Maintain 5% forbs for antelope: scarlet globemallow, lambsquarter, and eriogonum. Maintain 27% shrubs: rabbitbrush, four-wing saltbush, and winterfat.	Increase plant density from 15% to 20% in 10 years. Decrease erosion class from "Slight" to "Stable."	--	Maintain forage production for cattle at 76 AUMs.	Monitor Indian ricegrass, scarlet globemallow, and winterfat.
16P East & West San Luis	Maintain 15% forbs, 35% shrubs, and 50% grass to assure forage for wildlife.	Maintain erosion class of "Slight."	--	Maintain forage production for cattle at 262 AUMs.	Increase western wheatgrass from 15% to 20%.
22P Piney Creek	Reserve 90% annual growth of mountain mahogany for elk and deer.	--	--	Maintain forage production for cattle at 171 AUMs.	Maintain present species composition at 60% grass, 10% forbs, and 30% browse. Monitor needle-and-thread and western wheatgrass.
23P Steel Canyon	Reserve 90% annual growth of mountain mahogany for elk and deer. Maintain present habitat for 250 antelope; also 25-35 deer days per acre, and 5 elk days per acre. Maintain forbs at 15% of species composition.	Maintain erosion class of "Slight."	--	Maintain forage production for cattle at 210 AUMs.	Increase Arizona fescue and western wheatgrass to 30% species composition.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
24P Mirage	--	Increase ground cover from 17% to 25%.	--	Maintain forage production for cattle at 187 AUMs.	Increase western wheatgrass from 10% to 18%-20%.
25E Valley View Hot Springs	Maintain habitat for 30 antelope and 100 deer yearlong.	Increase ground cover from 15% to 20%. Increase litter from 8% to 10%.	--	Increase forage production for cattle from 427 AUMs to 536 AUMs.	Change dominant grass from blue grama to western wheatgrass and needle-and-thread.
28P Cotton Creek	Reserve 90% annual growth of mountain mahogany for big game.	Reduce erosion class from "High-Moderate" to "Slight" by increasing ground cover.	Maintain stream bank vegetation over at least 35% of shoreline of Cotton Creek.	Maintain forage production for cattle at 312 AUMs.	Increase western wheatgrass by 50%.
31P Hutchinson	Reserve 75% annual growth of mountain mahogany for deer.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 25%.	--	Maintain forage production for cattle at 18 AUMs and for horses at 59 AUMs.	Increase Indian ricegrass and sand dropseed from 5% to 15%.
34P Mineral Hot Springs	--	Reduce erosion class from "High-Moderate" to "Low-Moderate."	--	Maintain forage production for cattle at 1,030 AUMs.	Increase Indian ricegrass and western wheatgrass from 1% to 10%. Maintain 10% winterfat and 6% fourwing saltbush.
36P McIntyre Gulch	--	Reduce erosion class from "Moderate" to "Slight."	--	Maintain forage production for cattle at 311 AUMs.	Increase Arizona fescue and sand dropseed from 20% to 30%.
39P Findley Gulch	--	--	--	Maintain forage production for cattle at 753 AUMs.	Increase Indian ricegrass from 2% to 8% and western wheatgrass from 4% to 20%.
41P Laughlin Gulch	Reserve 90% annual growth of mountain mahogany for elk and deer.	Reduce erosion class from "Slight" to "Stable."	--	Maintain forage production for cattle at 426 AUMs.	Achieve the following plant composition: 15% forb, 25% browse, and 60% grass. Monitor western wheatgrass and Arizona fescue.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
42P Poison Gulch	Reserve 90% annual growth of mountain mahogany for elk, deer, antelope, and mountain sheep.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 30%.	Increase stream bank cover to 25% on Ford Creek. Maintain present riparian vegetation along Tuttle Creek.	Maintain forage production for cattle at 867 AUMs and for horses at 88 AUMs.	Increase Arizona fescue and western wheatgrass from 25% to 35% in the conifer and pinyon-juniper vegetative type, and increase western wheatgrass from a "trace" to 15% in the lower portions of the allotment.
45P Cross Creek	Reserve 90% annual growth of mountain mahogany for big game.	Reduce erosion class from "Slight" to "Stable."	Reduce livestock grazing pressure on stream banks.	Maintain forage production for cattle at 301 AUMs.	Increase Arizona fescue from 3% to 15%.
46P Trickle Mountain	Reserve 90% annual growth of mountain mahogany for big game and 15% as seedlings and young plants. Increase tufted hairgrass from 10% to 50% on wet areas of springs.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover.	--	Maintain forage production for cattle at 1,008 AUMs.	Increase western wheatgrass from 3% to 15% and Arizona fescue from 20% to 30%.
47P Sheep Creek	Maintain habitat by allowing only fall livestock grazing to avoid competition to wildlife for spring forage.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover.	--	Maintain forage production for cattle at 202 AUMs.	Increase Arizona fescue from 3% to 8%.
48P Taylor Canyon	Reserve 75% annual growth of mountain mahogany for deer and elk.	Increase ground cover from 13% to 20%. Reduce erosion class from "Moderate" to "Slight."	--	Maintain forage production for cattle at 245 AUMs.	Increase Arizona fescue from 27% to 35% and western wheatgrass from 5% to 15%. Maintain "trace" of scarlet globemallow.
50P Rabbit Canyon	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 15% to 20%.	--	Maintain forage production for cattle at 292 AUMs.	Increase Arizona fescue and western wheatgrass from 5% to 20%. Maintain Arizona fescue and 25% species composition in conifer type. Maintain scarlet globemallow at a "trace."

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
51E Saguache Park	--	--	--	Maintain forage production for cattle at 118 AUMs.	
52P Hat Springs	Reserve 50% annual growth of mountain mahogany for elk.	--	--	Maintain forage production for cattle at 373 AUMs.	Increase Arizona fescue and western wheatgrass from 5% to 15%. Monitor balance of 25% browse, 10% forbs, and 65% grass.
53P Robb Ranch	Maintain 98% mountain mahogany in a satisfactory condition. Maintain habitat for 250 bighorn sheep.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 24% to 35%.	--	Maintain forage production for cattle at 113 AUMs.	Monitor mountain mahogany at 5%. Increase Arizona fescue from 3% to 10%.
55P Mill Hill	Reserve 90% annual growth of mountain mahogany for sheep, deer, and elk.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover.	--	Maintain forage production for cattle at 263 AUMs.	Increase Arizona fescue from 5% to 20%.
56P Higgins Spring	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 10% to 20%.	--	Maintain forage production for cattle at 49 AUMs.	Maintain Arizona fescue at 40% of species composition.
57P Mitchell	--	--	--	Maintain forage production for cattle at 25 AUMs.	Reduce lambsquarter from 64% to 32%. Increase winterfat from 8% to 27% and four-wing saltbush from 1% to 5%.
58P West Tracy Ridge	Reserve 4-in. growth of winterfat for wildlife winter use.	Allow litter accumulation.	--	Maintain forage production for cattle at 16 AUMs.	Monitor blue grama, winterfat, and western wheatgrass.
59P Tracy Ridge	Reserve 70% annual growth of four-wing saltbush for wildlife.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 10% to 20%.	--	Maintain forage production for cattle at 45 AUMs.	Increase western wheatgrass and Indian ricegrass from 4% to 15%. Monitor four-wing saltbush.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
60P Tracy Cattlemen's	Reserve 70% annual growth of mountain mahogany for deer and elk.	Maintain present "Slight" erosion class.	--	Maintain forage production for cattle at 2,930 AUMs.	Increase winterfat and sand dropseed from 1% to 10%, western wheatgrass and Indian ricegrass from 1% to 10%, and pine needlegrass from 1% to 10%.
61P Tracy Individual	Reserve 90% annual growth of mountain mahogany for deer and elk.	Maintain or reduce "Slight" erosion class. Maintain 25% plant density.	--	Maintain forage production for cattle at 100 AUMs.	Maintain present 80% grass, 4% to 5% forbs, and 15% browse species composition. Increase western wheatgrass and Arizona fescue. Reduce blue grama. Monitor squirrel tail and mountain mahogany.
63P Biedell Creek	Increase mountain mahogany from 1% to 5%, and reserve 90% of annual growth for deer and elk.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover from 20% to 35% in grass type.	--	Maintain forage production for cattle at 172 AUMs.	Increase Arizona fescue from 15% to 30% and western wheatgrass from 2% to 15%.
64P East of Carnero Creek	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" and "Slight" to "Stable" by increasing ground cover from 10%-20% to 25%-30%.	--	Maintain forage production for cattle at 630 AUMs.	Increase western wheatgrass from 5% to 20%, and Arizona fescue from 20% to 40%.
65P Upper Coolbroth	Reserve 90% annual growth of mountain mahogany for deer and elk.	Increase ground cover from 15% to 30%.	--	Maintain forage production for cattle at 74 AUMs.	Increase Arizona fescue from 40% to 60%.
66P Lower Coolbroth	--	Increase ground cover from 15% to 30%. Reduce erosion class from "Slight" to "Stable."	--	Maintain forage production for cattle at 29 AUMs.	Increase Arizona fescue from 40% to 60%.
67P Carnero Creek	Reserve 50% annual growth of mountain mahogany for big game.	Increase ground cover from 10% to 25%.	--	Maintain forage production for sheep at 104 AUMs.	Increase western wheatgrass and needle-and-thread from 1% to 20%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
68P La Garita	Reserve 50% annual growth of mountain mahogany for big game.	--	--	Maintain forage production for sheep at 73 AUMs.	Maintain 3% mountain mahogany in rock outcrop areas. Increase western wheatgrass and needle-and-thread from 1% to 20%.
69P Elephant Rocks	--	Increase litter from 22% to 29%. Reduce bare ground from 42% to 33% to reduce the erosion class from "Moderate" to "Slight."	--	Maintain forage production for sheep at 93 AUMs.	Increase western wheatgrass and four-wing saltbush from "trace" and 8% to 13% and 12% respectively.
70P Rio Grande Canal	--	Reduce bare ground from 45% to 37%.	--	Maintain forage production for sheep at 225 AUMs.	Increase Indian ricegrass from "trace" to 8%.
73P Alder Creek	Reserve 90% annual growth of mountain mahogany for deer and elk.	--	--	Maintain forage production for cattle at 20 AUMs.	Maintain plant density at 30%-35%. Monitor western wheatgrass and Indian ricegrass.
76P Sanderson	Reserve 90% annual growth of mountain mahogany for deer and elk.	--	--	Maintain forage production for cattle at 32 AUMs.	Maintain 25% species composition of mountain mahogany, green rabbitbrush, winterfat, and four-wing saltbush.
77P Bowen	Maintain 25% browse composition species. Reserve 90% annual growth of mountain mahogany for big game.	Reduce "Moderate" soil erosion class to "Slight."	--	Maintain forage production for cattle at 32 AUMs.	Increase western wheatgrass from 1% to 10%.
78P Schrader Creek	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 14% to 30%.	--	Maintain forage production for cattle at 42 AUMs.	Increase western wheatgrass and blue grama from 20% to 35%.
79P Branch	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Slight."	--	Maintain forage production for cattle at 143 AUMs.	Increase Indian ricegrass from 8% to 20% and winterfat and four-wing saltbush from 10% to 20%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
80P Pup Peak	Maintain mountain mahogany, winterfat, four-wing saltbush, and little rabbitbush at 25% species composition for wildlife. Reserve 50% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 25%.	--	Maintain forage production for sheep at 404 AUMs.	Increase western wheatgrass from 2% to 10%.
81P Limekiln	Maintain winterfat, little rabbitbush, and four-wing saltbush at 25% species composition for wildlife.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 14% to 25%.	--	Maintain forage production for sheep at 370 AUMs.	Increase western wheatgrass from 1% to 10%.
82P Nicomodes	--	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 15% to 25%.	--	Maintain forage production for sheep at 304 AUMs.	Maintain little rabbitbush, winterfat, and four-wing saltbush at 25% species composition. Increase western wheatgrass from 1% to 10%.
83P Raton Creek	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 16% to 25%.	--	Maintain forage production for cattle at 307 AUMs.	Increase western wheatgrass from 7% to 20%. Maintain winterfat, mountain mahogany, four-wing saltbush, and little rabbitbush at 25% species composition.
84P Rock Creek	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover from 15% to 25%.	--	Maintain forage production for sheep at 1,147 AUMs.	Increase mountain mahogany from "trace" to 20%, and western wheatgrass from 2% to 10%. Maintain winterfat, four-wing saltbush, and little rabbitbush at 25% species composition.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
85P McMahon	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Stable" by increas- ground cover from 15% to 25%.	Maintain present riparian vegetation condition.	Maintain forage production for sheep at 1,287 AUMs.	Maintain mountain mahogany, winterfat, four-wing saltbush, and little rabbitbush at 25% species composition.
86P Greenie Mountain	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover from 14% to 25%.	--	Maintain forage production for sheep at 598 AUMs.	Maintain little rabbitbush, mountain mahogany, winterfat, and four-wing saltbush at 25% species composition.
87P Gato-Hutchinson	Maintain 25% ground cover for big game. Reserve 50% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover.	--	Maintain forage production for sheep at 228 AUMs.	Monitor western wheatgrass, blue grama, Arizona fescue, mountain mahogany, winterfat, and four-wing saltbush.
88P Triangle	Reserve 50% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 14% to 25%.	--	Maintain forage production for sheep at 315 AUMs.	Maintain mountain mahogany, little rabbitbush, winterfat, and four-wing saltbush at 25% species composition.
89P Alamosa River	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 30% to 40%.	--	Maintain forage production for sheep at 40 AUMs.	Increase Indian ricegrass from 3% to 15% and winterfat from 5% to 10%. Monitor western wheatgrass.
93P Posito Creek	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class "Moderate" to "Slight" by increasing ground cover from 15% to 20%.	--	Maintain forage production for cattle at 350 AUMs.	Increase western wheatgrass from 5% to 20%.
94P Jadero Flat	--	Reduce erosion class from "Critical" to "Slight" by increasing ground cover from 13% to 20%.	--	Maintain forage production for sheep at 323 AUMs.	Increase winterfat from 6% to 15% and western wheatgrass from 2% to 10%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
95P Poso Creek	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 15% to 20%.	--	Maintain forage production for sheep at 206 AUMs.	Increase winterfat from 13% to 20% and western wheatgrass from 5% to 10%.
96P Capulin	Increase winterfat from 40% to 45% and four-wing saltbush from 5% to 10%.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover.	--	Maintain forage production for sheep at 587 AUMs.	Increase western wheatgrass from 5% to 10% and blue grama from 5% to 15%.
97P Romero Canyon	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class "Slight" to "Stable" by increasing ground cover from 18% to 25%.	--	Maintain forage production for cattle at 127 AUMs.	Maintain Arizona fescue at 23% species composition.
98P Ra Jadero Canyon	Reserve 90% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Critical" to "Slight" by increasing ground cover from 13% to 20%.	--	Maintain forage production for cattle at 621 AUMs.	Increase western wheatgrass to 20%.
99P Cinder Pits	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 18% to 25%.	--	Maintain forage production for cattle at 1,162 AUMs.	Increase western wheatgrass from 19% to 25%. Maintain winterfat, little rabbitbush, and four-wing saltbush at 25% species composition.
100E Ciscom Flat	Maintain winterfat, four-wing saltbush, and scarlet globemallow at 10%, 8%, and 3% respectively for antelope.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover 10%.	--	Maintain forage production for cattle at 192 AUMs.	Increase western wheatgrass from 8% to 28%.
102P La Jara Creek	Maintain a diversity of vegetation for wildlife.	--	Maintain 35% shade and cover on La Jara Creek.	Maintain forage production for cattle at 64 AUMs.	Increase Arizona fescue from 30% to 50%. Maintain nodding brome at 25%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
106P Little Mogotes	--	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 19% to 25%.	--	Maintain forage production for sheep at 720 AUMs and for cattle at 724 AUMs.	Increase western wheatgrass from 19% to 25%.
107P Grande	Reserve 50% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Critical" to "Moderate" by increasing ground cover.	--	Maintain forage production for sheep at 426 AUMs.	Increase western wheatgrass from 20% to 30%.
108P Mogote Flat	Maintain 50% annual growth of little rabbitbrush, winterfat, and four-wing saltbush for deer, elk, and antelope.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 15% to 20%.	--	Maintain forage production for sheep at 206 AUMs.	Maintain western wheatgrass at 35% and Indian ricegrass at 10% of species composition.
109P Poso	Reserve 90% annual growth of mountain mahogany, big sage, and four-wing saltbush for deer and antelope.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 15% to 20%.	--	Maintain forage production for cattle at 276 AUMs.	Increase western wheatgrass from 2% to 15% and winterfat from 3% to 15%.
110P Los Mogotes	Reserve 90% annual growth of mountain mahogany, big sagebrush, and four-wing saltbush for big game.	Reduce erosion class from "Critical" to "Moderate" by increasing ground cover from 10% to 20%.	--	Maintain forage production for cattle at 662 AUMs.	Increase western wheatgrass from 6% to 15%. Monitor winterfat.
111P Big Horn Creek	Reserve 50% annual growth of mountain mahogany for deer and elk.	Reduce erosion class from "Critical" to "Moderate" by increasing ground cover from 20% to 30%.	--	Maintain forage production for cattle at 88 AUMs.	Increase Arizona fescue from zero to 10% and western wheatgrass from 2% to 10%. Maintain 90% mountain mahogany in a satisfactory browse condition.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
112P Railroad	Reserve 90% annual growth of mountain mahogany and big sage on 1/3 of the allotment for deer and elk.	Reduce erosion class from "Critical" to "Moderate" by increasing ground cover from 15% to 25%.	--	Maintain forage production for sheep at 159 AUMs.	Increase western wheatgrass from 5% to 15%.
113P Llano	--	Reduce erosion class from "Critical" to "Moderate" by increasing ground cover.	--	Maintain forage production for sheep at 150 AUMs.	Increase winterfat from 10% to 20% in 10 years. Increase western wheatgrass from 1% to 5%.
115P Alta Lake	Maintain winterfat, green rabbitbrush, and four-wing saltbush at 25% species composition.	Increase ground cover from 12% to 20% to reduce erosion class from "Slight" to "Stable."	--	Maintain forage production for sheep at 75 AUMs and for cattle at 500 AUMs.	Increase western wheatgrass from 1% to 10%.
116E Twin Lakes	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover 10%.	--	Maintain forage production for cattle at 653 AUMs.	Increase western wheatgrass from 1% to 20%.
117P River	--	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 20% to 30%.	Maintain present condition of riparian vegetation along the Rio Grande.	Maintain forage production for cattle at 200 AUMs.	Increase Indian ricegrass from 2% to 15%.
119P South Valley	Increase four-wing saltbush to 10% for wildlife.	Increase ground cover to 30% to reduce erosion class from "Moderate" to "Slight."	--	Maintain forage production for cattle at 136 AUMs.	Increase grass to 70%. Monitor blue grama, Indian ricegrass, winterfat, and four-wing saltbush.
120P Pinon	--	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover to 25%.	Maintain present habitat for fisheries along the Rio Grande.	Maintain forage production for sheep at 393 AUMs.	Maintain winterfat, four-wing saltbush, and little rabbitbrush at 30% species composition. Increase Indian ricegrass from "trace" to 10%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
121E Kiowa Hill	--	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover 10%.	--	Maintain forage production for cattle at 208 AUMs.	Increase western wheatgrass from 5% to 10%.
122P Braiden	Increase scarlet globemallow from 1% to 5% and four-wing saltbush from "trace" to 15%.	Increase ground cover from 20% to 50% to reduce erosion class from "Moderate" to "Stable."	--	Maintain forage production for cattle at 60 AUMs.	Increase Indian ricegrass from "trace" to 4% and sand dropseed from 4% to 15%. Monitor blue grama, four-wing saltbush, and scarlet globemallow.
123P Eight Mile	--	Reduce erosion class from "Moderate" to "Stable." Increase ground cover from 21% to 40%.	--	Maintain forage production for cattle at 212 AUMs.	Increase western wheatgrass from 8% to 20% and 35% to 40%; Indian ricegrass from 10% to 20%; and combined winterfat and four-wing saltbush from 24% to 30%.
124P Pinon Hills	Reserve 50% annual growth of winterfat and four-wing saltbush for antelope.	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 19% to 30%.	Maintain riparian vegetation composition and cover.	Maintain forage production for sheep at 598 AUMs.	Increase western wheatgrass and sand dropseed from 5% to 20%.
125P Rio Grande Common	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 23% to 40%.	Maintain riparian vegetation along the Rio Grande.	Maintain forage production for sheep at 281 AUMs and for cattle at 557 AUMs.	Increase Indian ricegrass from 8% to 15%, and winterfat and four-wing saltbush from 22% to 30%.
126P La Sauses	--	Reduce erosion class from "Critical" to "Slight" by increasing ground cover from 10% to 30%.	Improve riparian vegetation along the Rio Grande for approximately 2 miles.	Maintain forage production for cattle at 128 AUMs.	Increase western wheatgrass from "trace" to 10% and winterfat to 20%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
129P Rio Grande	--	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 10% to 15%.	--	Maintain forage production for cattle at 98 AUMs.	Increase Indian ricegrass from 10% to 20%.
132P Four Mile	--	Reduce erosion class from "Slight" to "Stable" by increasing ground cover from 20% to 30%.	--	Maintain forage production for cattle at 18 AUMs.	Increase alkali sacaton and Indian ricegrass from 15% to 25%.
133P Tobin Creek	Reserve 50% annual growth of mountain mahogany for deer and elk.	--	--	Maintain forage production for cattle at 235 AUMs.	Increase western wheatgrass by 60%. Achieve 15% forbs, 25% browse, and 60% grass plant composition.
134P Foothills	--	Reduce erosion class from "Moderate" to "Slight" by increasing ground cover from 10% to 20%.	--	Maintain forage production for cattle at 257 AUMs.	Maintain 15% forbs, 25% shrub, and 60% grass plant composition. Increase Indian ricegrass from 3% to 10% and western wheatgrass from 6% to 15%.
137P Blanca	Remove 65% of vegetation growth on 5-year cycle to enhance and renew nesting cover on wetland edges and meadows.	Reduce erosion class from "Moderate" to "Stable" by increasing ground cover from 15% to 20%.	--	Maintain forage production for cattle at 48 AUMs.	Increase combined percentages of western wheatgrass, Indian ricegrass, and alkali sacaton from 5% to 15%.
138P Dry Lakes	--	Reduce erosion class from "Slight" to "Stable". Increase ground cover on clay hardpan areas from 6% to 12%. Maintain 60% grass composition.	--	Maintain forage production for cattle at 139 AUMs.	Increase Indian ricegrass and western wheatgrass from 3% to 15%.

TABLE I-4. INTENSIVE MANAGEMENT OBJECTIVES FOR RENEWABLE RESOURCES (cont.)
(20-YEAR TIME FRAME)

Allotment Number & Name*	Wildlife Habitat	Watershed Protection**	Aquatic Habitat	Livestock Production on NRL	Vegetation (Key Species)
141P Zapata Falls	Reserve 75% annual growth of mountain mahogany for wildlife.	Increase litter to a minimum of 15% of ground cover. Increase ground cover from 25% to 40%.	--	Maintain forage production for cattle at 326 AUMs.	Maintain Indian ricegrass, sand dropseed, 12% forbs, 20% browse, and 68% grass. Monitor western wheatgrass and mountain mahogany.
159E Klondyke	--	Stabilize stream banks. Achieve and maintain plant cover to stabilize erosion.	--	Maintain forage production for cattle at 76 AUMs.	--

Grazing Systems

The type of grazing system selected to meet the needs of the various renewable resources (water, soil, vegetation, and wildlife) for the 95 AMPs was made by Bureau resource specialists (range conservationists, wildlife biologists, and watershed specialists).

According to Hormay (1970), the resource values would be maintained and improved almost entirely by timely resting of the range from use. The purpose of the rest period is fourfold. It would allow (1) plants the opportunity to make and store food--to recover vigor, (2) seeds to ripen, (3) seedlings to become established, and (4) litter to accumulate between plants. Phenological data for major plant species is shown in table I-5. Five systems of grazing--rest rotation, deferred rest rotation, deferred rotation, deferred, and season-long (summer)--used in the 95 AMPs will be analyzed in this statement. Table I-6 summarizes acres and AUMs by grazing management systems. Major points considered in selecting these grazing systems include:

1. Wildlife--species, seasons of use and forage needs
2. Watershed--conditions and soil characteristics
3. Livestock--seasons of use, numbers and class
4. Vegetation--condition, production, physiological requirements and existing use.
5. Climate--precipitation, amount and occurrence
6. Topography--steepness of slope and elevation
7. Range Improvements--costs of fencing, water development and erosion control structures and existing improvements
8. Land ownership patterns
9. Other resources--timber, recreation, and minerals

TABLE I-5. PHENOLOGICAL DATA FOR PLANTS IN THE SAN LUIS VALLEY

		Development Stages				
		Date				
Species		Start Growth	Flowering	Peak of Flowering	Seed Ripe	Seed Disseminate
Grasses						
Western wheatgrass	Agsm	4-25	6-25	7-10	8-1	9-10
Blue grama	Bogr	5-1	8-1	8-15	10-1	10
Arizona fescue	Fear	4-25	7-10	7-25	8-25	9
Indian ricegrass	Orhy	4-20	6-10	6-25	7-5	7
Mountain muhly	Mumo	5-5	8-10	8-20	9-15	9
Ring muhly	Muto					
Red three-awn	Arlo	4-25	7-10	7-15	7-25	8
Sand dropseed	Spcr	5-1	7-25	8-10	9-10	9-10
Needle-and-thread grass	Stco	4-20	6-10	6-25	7-10	7
Squirreltail	Sihy	4-25	6-10	6-15		
Crested wheatgrass	Aqcr	4-25	6-30	7-20	8-25	9
Forbs						
Scarlet globemallow	Spco	4-25	6-6	7-14	8-5	
Russian thistle	Saka					
Buckwheat	Erio					
Pinque	Hyri					
Shrubs						
Mountain mahogany	Cemo	5-15		7-1	9-20	10-1
Winterfat	Eula	5-10		8-1	9-25	10-10
Four-wing saltbush	Atca	5-10		6-25	9-25	10-10
Big sagebrush	Artr					
Fringed sagebrush	Arfr					
Green rabbitbrush	Chgr	5-1	7-1			
Rubber rabbitbrush	Chna					

TABLE I-6. SUMMARY OF INTENSIVE GRAZING MANAGEMENT

Grazing System	Quantity	AUMs	Total Acres a/	Acres Rested Yearlong b/	Acres Grazed b/			
					Spring c/	Summer	Fall	Winter
Rest Rotation								
One-pasture	7	285	7,207	2,333	777	2,512	1,585	0
Two-pasture	1	49	753	251	0	502	0	0
Three-pasture	24	15,150	180,084	60,016	33,440	48,997	28,046	9,585
Four-pasture	7	4,638	62,387	15,603	10,695	17,094	14,588	4,407
Five-pasture	4	1,516	23,569	7,646	0	15,923	0	0
Subtotals	43	21,638	274,000	85,849	44,912	85,028	44,219	13,992
Deferred Rest Rotation								
One-pasture	5	567	9,173	2,994	0	0	5,579	600
Two-pasture	1	60	960	160	0	0	800	0
Three-pasture	13	4,800	86,888	28,963	0	0	32,393	25,532
Four-pasture	3	1,349	21,498	5,376	0	0	6,623	9,499
Subtotals	22	6,776	118,519	37,493	0	0	45,395	35,631
Deferred Rotation								
Two-pasture	13	2,777	47,628	0	14,067	13,749	16,749	3,063
Three-pasture	3	1,228	11,473	0	761	8,694	2,018	0
Subtotals	16	4,005	59,101	0	14,828	22,443	18,767	3,063
Deferred								
One-pasture	14	1,391	20,947	0	0	4,541	16,406	0
Season-long								
One-pasture	1	133	1,349	0	450	899	0	0
TOTAL	96 d/	33,943	473,916	123,342	60,190	112,911	124,787	52,686

a/ Total acres is broken down, in the columns to the right, into Acres Rested and Acres Grazed. Acres Grazed is also broken down, into Acres Grazed in each season.

b/ Average number of acres rested or grazed in one year.

c/ Seasons are as follows: Spring 3-21 to 6-20 Summer 6-21 to 9-22
Fall 9-23 to 12-20 Winter 12-21 to 3-20

d/ A total of 96 grazing systems are shown since one AMP (Arizona-Colorado Allotment) has two separate systems.

Livestock graze range lands selectively by species and area--grazing the most palatable plants and accessible area closely. Plants grazed heavily one year tend to be grazed heavily the next, until the choicest plants are gradually destroyed. Livestock then graze on less palatable plants, leading to an ever enlarging area of range deterioration (Hormay 1970, Stoddard and Smith 1955).

Rest Rotation

Sampson and Malmsten (1926) identified a deferred and rotation plan of grazing management that would allow for maximum use of forage while at the same time keeping the land in a high state of productivity. This grazing plan was based on the growth requirements of range vegetation, together with methods of managing livestock to foster seed production, to provide for planting of the seed crop, and to provide forage for livestock during the revegetation period. This plan would reserve portions of the range from livestock grazing until after seed had ripened and would also provide for rest in the following growing season, to avoid destruction of the newly established seedlings.

This was a forerunner to rest rotation grazing systems. Hormay and Talbot (1961) expanded these grazing principles through range research conducted on the Burgess Spring Experimental Range from 1936 to 1951.

These principles of grazing management have been tested on the Harvey Valley Cattle allotment in Lassen National Forest since 1954. Numerous rest rotation grazing systems have been implemented throughout the Western United States.

To implement rest rotation grazing on an allotment, the range would be divided into pastures of comparable grazing capacities, each being systematically grazed and rested to provide for production of livestock and other resource values while simultaneously maintaining or improving the vegetation and soil fertility (Hormay 1970, Johnson 1965, Ratliff et al. 1972, Ratliff and Reppert 1974).

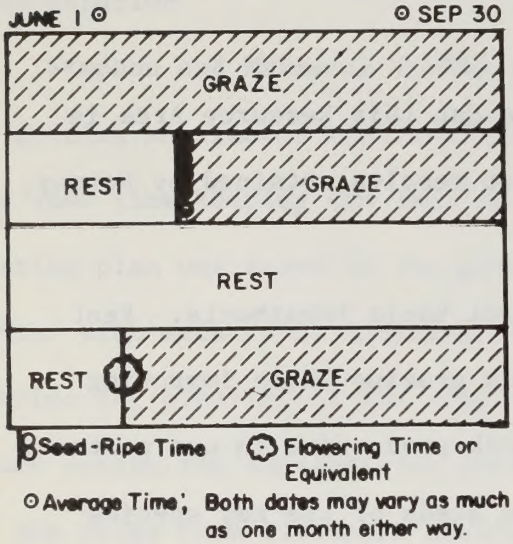
Rest rotation grazing management in the San Luis Resource Area is resulting in plant responses similar to those results obtained by Hormay, Johnson, and Ratliff.

Rest rotation grazing consists of several basic treatments. Rest rotation was developed to allow for livestock grazing while improving the range. One treatment allows for livestock production in one pasture. A second treatment rests a pasture until the seeds of the key species ripen. The pasture is then grazed, thereby letting the livestock trample the seeds, which assures that the seeds are planted (Hormay 1970, Humphrey 1962). A third treatment involves resting a pasture for one year. A fourth treatment rests a pasture until the key species have flowered; then the pasture is grazed. Grazing after the key species flowering has peaked allows the seedlings that have been established during the yearlong rest period to put out additional secondary roots which, in turn, helps keep the livestock from pulling up and destroying new, tender plants.

Table I-5 (p.I-40) lists the dates for the development stages of the grasses, forbs, and shrubs in the San Luis Valley.

Forty-three rest rotation grazing systems (see table I-2, pp. I-5 f.) affecting 274,000 acres (see table I-6, p.I-41), which is 53 percent of NRL in the San Luis Resource Area, have been proposed.

The schematic for a typical rest rotation system is as follows:


JUNE 1 ⊙
⊙ SEP 30
GRAZE
REST
GRAZE
REST
REST
GRAZE
Seed-Ripe Time
Flowering Time or Equivalent
⊙ Average Time; Both dates may vary as much as one month either way.

Treatments

A. Graze for livestock production.

B. Rest until seed ripe to restore vigor, then graze for seed trampling.

C. Rest season-long for seedling establishment, vigor, etc.

D. Rest until peak of flowering for seedling establishment, then graze for livestock production.

A grazing schedule through one cycle of a typical rest rotation system is:

	Pastures			
Years	1	2	3	4
1st	A	B	C	D
2nd	B	C	D	A
3rd	C	D	A	B
4th	D	A	B	C
repeat 1st	A	B	C	D

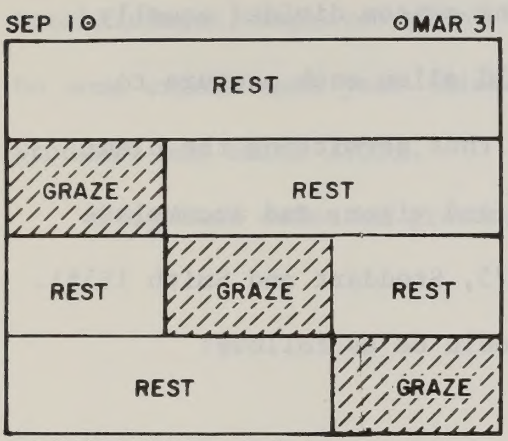
Deferred Rest Rotation Grazing

Deferred rest rotation grazing would be applied to 118,519 acres in the resource area. A total of 22 deferred rest rotation grazing systems are proposed (see tables I-2, pp.I-5 f., and I-6, p.I-41).

Deferred rest rotation grazing would probably have effects similar to rest rotation on the various resources in the San Luis Resource Area, since the major difference between it and rest rotation would be the season of use.

AMPs with deferred rest rotation grazing systems would be grazed during the fall and winter (dormant season). Range management personnel from Texas Tech University concluded from studies conducted in northwest New Mexico that grazing restricted to the dormant seasons seems about as effective for rangeland management as total livestock removal yearlong. Grazing of cured or dried vegetation (grasses and forbs) does not affect the ability of these plants to manufacture food, since this process (photosynthesis) occurs only in the green and growing leaves and stems (Humphrey 1962). However, with woody plants (browse), food storage and new growing points are on the branches or stems. Heavy grazing during the dormant period can harm these plants (Cook 1971, Hormay 1970, Laycock 1961). With deferred rest rotation, one pasture would be rested yearlong while two or more pastures would be rested until fall and then grazed in a sequence during the dormant period (fall or winter). Since all plants would be rested during the growing season and would have some rest during the dormant period, vigor would improve, litter would accumulate, ground cover would increase, and range condition would improve (Hickey and Garcia 1964, Laycock 1961, Reynolds 1959).

A typical deferred rest rotation schematic would be as follows:



⊙AVERAGE DATES; Both dates may vary as much as one month either way.

Treatments

A. Rest yearlong for seedling establishment, vigor, litter accumulation, etc.

B., C., D. Graze each pasture equally (based on grazing capacity of pastures).

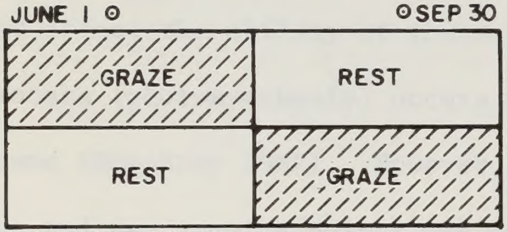
A grazing schedule through one cycle of a typical deferred rest rotation system would be:

	Pastures			
Years	1	2	3	4
1st	A	B	C	D
2nd	B	C	D	A
3rd	C	D	A	B
4th	D	A	B	C
repeat 1st	A	B	C	D

Deferred Rotation Grazing

Sixteen deferred rotation grazing systems are proposed, which would affect 59,101 acres in the San Luis Resource Area (see tables I-2, pp.I-5 f., and I-6, p.I-41). Deferred rotation grazing systems would involve two or more pastures, with the grazing season divided equally between the pastures. Deferred rotation would allow each pasture to rest successively during the growing season, thus permitting the plant species to produce seed, establish seedlings and vigor, and accumulate litter (Freeman 1964, Reardon and Merrill 1975, Stoddart and Smith 1955).

A typical deferred rotation schematic would be as follows:



⊙AVERAGE DATES; Both dates may vary as much as one month either way.

Treatments

A. Graze for livestock production, then rest for plant regrowth.

B. Rest to allow plants to regain vigor and produce seed, then graze for seed trampling.

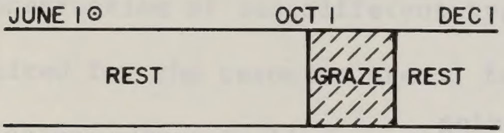
A typical deferred rotation schedule would be as follows:

	Pastures	
Years	1	2
1st	A	B
2nd	B	A
repeat 1st	A	B

Deferred Grazing

As shown in tables I-2 (pp.I- 5 f.) and I-6 (p.I-41), 20,947 acres in the resource area would be affected by fourteen proposed deferred grazing systems. By implementing such systems, livestock grazing would be delayed until after seed-ripe of key plants. Reproduction, seedling establishment, improved plant vigor, and litter accumulation would occur to some extent each year (Hickey et al. 1964, Laycock 1961, Reynolds 1959, Stoddart and Smith 1955).

A typical deferred grazing schematic would be as follows:



⊙AVERAGE DATES; Date may vary as much as one month either way.

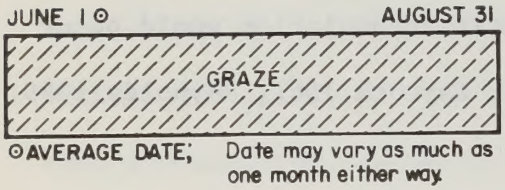
Treatment

A. Rest until end of growing season to allow all plants to complete their physiological growth requirements; then graze for livestock production and seed trampling.

Season-Long Grazing

One season-long summer grazing system is proposed for the resource area, affecting 1,349 acres (see tables I-2, pp.I-5 f., and I-6, p.I-41). No change in present management is proposed for this allotment, since it is in fair to good condition.

A season-long grazing schematic would be as follows:


JUNE 1 ⊙
AUGUST 31
GRAZE
⊙AVERAGE DATE; Date may vary as much as one month either way.

Treatment

A. Graze for livestock production.

Elimination of Grazing

Elimination of livestock grazing is proposed for nine management units in the resource area, totaling 5,930 acres of NRL. (See figure I-2 (in back cover pocket) and table I-2 for specific units.) Elimination of grazing is proposed for these units because they are too steep (with slopes usually exceeding 50 percent), have low forage production (less than 25 pounds of usable forage per acre per year), have high wildlife values, and/or have a watershed that is in critical erosion condition. This component would eliminate a total of 179 AUMs presently allowed for the specified parcels.

Elimination of grazing would be accomplished by relinquishing or canceling grazing use and would be enforced through trespass control.

Implementation Schedule

The proposed AMPs and the elimination of grazing would be implemented during an eight-year time period as shown in table I-7. Table I-8 lists when construction of range improvements would begin and identifies the year that each AMP and elimination would be implemented.

Development of Range Improvements

As previously noted, the development of range improvements would be required in order to facilitate the implementation of the intensive management of grazing and the elimination of grazing. Specifically, construction of ten different types of range improvements would be required for the resource area: fences (including boundary markers), cattleguards, pipelines, wells, water storage tanks, rainfall catchments, reservoirs, check dams, springs, and watering troughs.

Range improvements, such as new livestock water sources, pasture and allotment-boundary fences, and earthen erosion-control structures, would be needed for implementing the grazing systems of the proposed AMPs. On those areas for which grazing would be eliminated, 5.5 miles of fencing would be needed. Table I-2 (pp.I-5 f.) and figure I-2 (located in back cover pocket) show the units of land for which the construction of range improvements is proposed.

TABLE I-7. SCHEDULE FOR IMPLEMENTING PROPOSED ALLOTMENT MANAGEMENT PLANS AND ELIMINATION OF GRAZING*

Year 1		Year 2		Year 3		Year 4	
1P	Poncha Pass West	4P	West Clover Creek	36P	McIntyre Gulch	39P	Findley Gulch
26Eg	Garner Creek**	28P	Cotton Creek	55P	Mill Hill	45P	Cross Creek
27Eg	South**	47P	Sheep Creek	59P	Tracy Ridge	46P	Trickle Mountain
57P	Mitchell	63P	Biedell Creek	74Eg	Masonic Park	50P	Rabbit Canyon
58P	West Tracy Ridge	76P	Sanderson	80P	Pup Peak	64P	E. of Carnero Creek
66P	Lower Coolbroth	87P	Gato-Hutchinson	81P	Limekiln	70P	Rio Grande Canal
77P	Bowen	88P	Triangle	84P	Rock Creek	86P	Greenie Mountain
94P	Jadero Flat	102P	La Jara Creek	97P	Romero Canyon	108P	Mogote Flat
105Eg	Pastures	104Eg	La Jara Canyon	98P	Ra Jadero Canyon	110P	Los Mogotes
111P	Big Horn Creek	112P	Railroad	99P	Cinder Pits	133P	Tobin Creek
113P	Llano	118Eg	Mondragon**	106P	Little Mogotes	138P	Dry Lakes
132P	Four Mile	122P	Braiden	127Eg	Saddleback	140Eg	Park Pasture**
137P	Blanca						

Year 5		Year 6		Year 7		Year 8	
16P	East & West San Luis Creek	22P	Piney Creek	11P	Kerber Creek	7P	Alder
42P	Poison Gulch	23P	Steel Canyon	15P	Nye	53P	Robb Ranch
65P	Upper Coolbroth	24P	Mirage	41P	Laughlin Gulch	67P	Carnero Creek
69P	Elephant Rocks	31P	Hutchinson	48P	Taylor Canyon	68P	La Garita
82P	Nicomodes	34P	Mineral Hot Springs	52P	Hat Springs	78P	Schrader Creek
96P	Capulin	56P	Higgins Spring	61P	Tracy Individual	79P	Branch
109P	Poso	60P	Tracy Cattlemen's	73P	Alder Creek	89P	Alamosa River
115P	Alta Lake	107P	Grande	83P	Raton Creek	93P	Posito Creek
125P	Rio Grande Common	120P	Pinon	85P	McMahon	117P	River
126P	La Sauses	123P	Eight Mile	95P	Poso Creek	119P	South Valley
129P	Rio Grande	124P	Pinon Hills			141P	Zapata Falls

* P = Proposed AMP, Eg = Elimination of Grazing

** Allotments require fencing in order to eliminate livestock grazing

TABLE I-8. COMPARISON OF SCHEDULES FOR STARTING IMPROVEMENT CONSTRUCTION AND IMPLEMENTING PROPOSED ACTION

Allotment Number and Name*		Year		Allotment Number and Name*		Year	
		Start Improvement Construction	Implement Proposed Action			Start Improvement Construction	Implement Proposed Action
1P	Poncha Pass West	1	**	80P	Pup Peak	1	3
4P	West Clover Creek	--	2	81P	Limekiln	1	3
7P	Alder	--	8	82P	Nicomodes	5	**
11P	Kerber Creek	5	7	83P	Raton Creek	5	7
15P	Nye	6	7	84P	Rock Creek	1	3
16P	East & West San Luis Creek	3	5	85P	McMahon	5	7
22P	Piney Creek	5	6	86P	Greenie Mountain	2	4
23P	Steel Canyon	4	6	87P	Gato-Hutchinson	2	**
24P	Mirage	4	6	88P	Triangle	2	**
26Eg	Garner Creek	1	**	89P	Alamosa River	7	8
27Eg	South	1	**	93P	Posito Creek	6	8
28P	Cotton Creek	2	**	94P	Jadero Flat	1	**
31P	Hutchinson	5	6	95P	Poso Creek	7	**
34P	Mineral Hot Springs	4	6	96P	Capulin	3	5
36P	McIntyre Gulch	3	**	97P	Romero Canyon	2	3
39P	Findley Gulch	2	4	98P	Ra Jadero Canyon	1	3
41P	Laughlin Gulch	5	7	99P	Cinder Pits	1	3
42P	Poison Gulch	2	5	102P	La Jara Creek	--	2
45P	Cross Creek	2	4	104Eg	La Jara Canyon	--	2
46P	Trickle Mountain	1	4	105Eg	Pastures	--	1
47P	Sheep Creek	2	**	106P	Little Mogotes	1	3
48P	Taylor Canyon	6	7	107P	Grande	4	6
50P	Rabbit Canyon	3	4	108P	Mogote Flat	2	4
52P	Hat Springs	6	7	109P	Poso	3	5
53P	Robb Ranch	--	8	110P	Los Mogotes	2	4
55P	Mill Hill	1	3	111P	Big Horn Creek	1	**
56P	Higgins Spring	5	6	112P	Railroad	2	**
57P	Mitchell	--	1	113P	Llano	1	**
58P	West Tracy Ridge	1	**	115P	Alta Lake	2	5
59P	Tracy Ridge	--	3	117P	River	6	8
60P	Tracy Cattlemen's (Tracy Common)	3	6	118Eg	Mondragon Individual	2	**
61P	Tracy Individual	--	7	119P	South Valley	6	8
63P	Biedell Creek	1	2	120P	Pinon	3	6
64P	East of Carnero Creek	1	4	122P	Braiden	--	2
65P	Upper Coolbroth	--	5	123P	Eight-Mile	4	6
66P	Lower Coolbroth	--	1	124P	Pinon Hills	4	6
67P	Carnero Creek	--	8	125P	Rio Grande Common (Flat Top)	2	5
68P	La Garita	--	8	126P	La Sauses	4	5
69P	Elephant Rocks	5	**	127Eg	Saddleback Mountain	3	**
70P	Rio Grande Canal	2	4	129P	Rio Grande	3	5
73P	Alder Creek	6	7	132P	Four Mile	1	**
74Eg	Masonic Park	--	3	133P	Tobin Creek	3	4
76P	Sanderson	2	**	134P	Foothills	1	2
77P	Bowen	--	1	137P	Blanca Allotment (WHMA)	1	**
78P	Schrader Creek	--	8	138P	Dry Lakes	3	4
79P	Branch	7	8	140Eg	Park Pasture	4	**
				141P	Zapata Falls	7	8

* P = Proposed AMP, Eg = Elimination of Grazing

** Action to be implemented in the same year that construction of improvements would begin.

Maintenance

Various procedures would be followed to maintain the range improvements. Each year water developments would be periodically inspected to insure that they were in usable condition, and preventative maintenance would be performed as needed. Fence maintenance would be carried out at five-year intervals. Any repairs requiring actual reconstruction of an improvement would be done by the Bureau. Normal operational or preventative maintenance required annually or more frequently, however, would be performed by the individual allottees.

Design Features

The Canon City District of the BLM has identified the following six design features that would be followed if range improvements were to be constructed in the San Luis Resource Area.

1. No permanent trails nor roads would be constructed to project sites. Existing access would be used.
2. Archaeological clearance would be required for all project sites prior to new construction.
3. All disturbed areas would be reseeded with a mixture of native and/or introduced species as soon as possible in order to replace ground cover on the sites.
4. Disturbance at all project sites would be held to a minimum.
5. No clearing of the project sites would be allowed except on sites requiring excavation.
6. Water would be maintained May through October at all established watering troughs.

Additional design features which have been specifically established for individual range improvements are identified in the subsequent discussion of the individual improvements.

Fences

An estimated 290.84 miles of fences would be required on the range to keep livestock within desired areas (see figure I-3).

Fence construction would involve the following steps.,

1. The fence lines would be surveyed with the survey being tied to a known reference point (section corners).
2. Stretch panels (two to three wooden posts approximately 6 feet apart with wooden braces between each post) would be constructed at each quarter-mile point along the lines (barbed wire comes in quarter-mile lengths).
3. The top wire would be unrolled and stretched between the panels.
4. The steel posts would be driven approximately 16.5 feet apart.
5. The remaining two wires would be unrolled and stretched between the panels.
6. The wires would be attached to each post at a specified spacing (see design features).
7. Steel-wire stays would be placed between each post.

Each of these operations would normally require off-road vehicular traffic along the fence (15 to 20 trips) which, along with the fence construction, would disturb an estimated 140.8 acres.

Gray-colored steel posts would be used in constructing fences so that the posts would blend into the landscape. If, however, there would be a need to increase fence-post visibility, then red or green steel posts or wooden posts would be used.

Where fences cross existing roads, either gates or cattleguards would be installed. Existing netwire fences would be modified with three

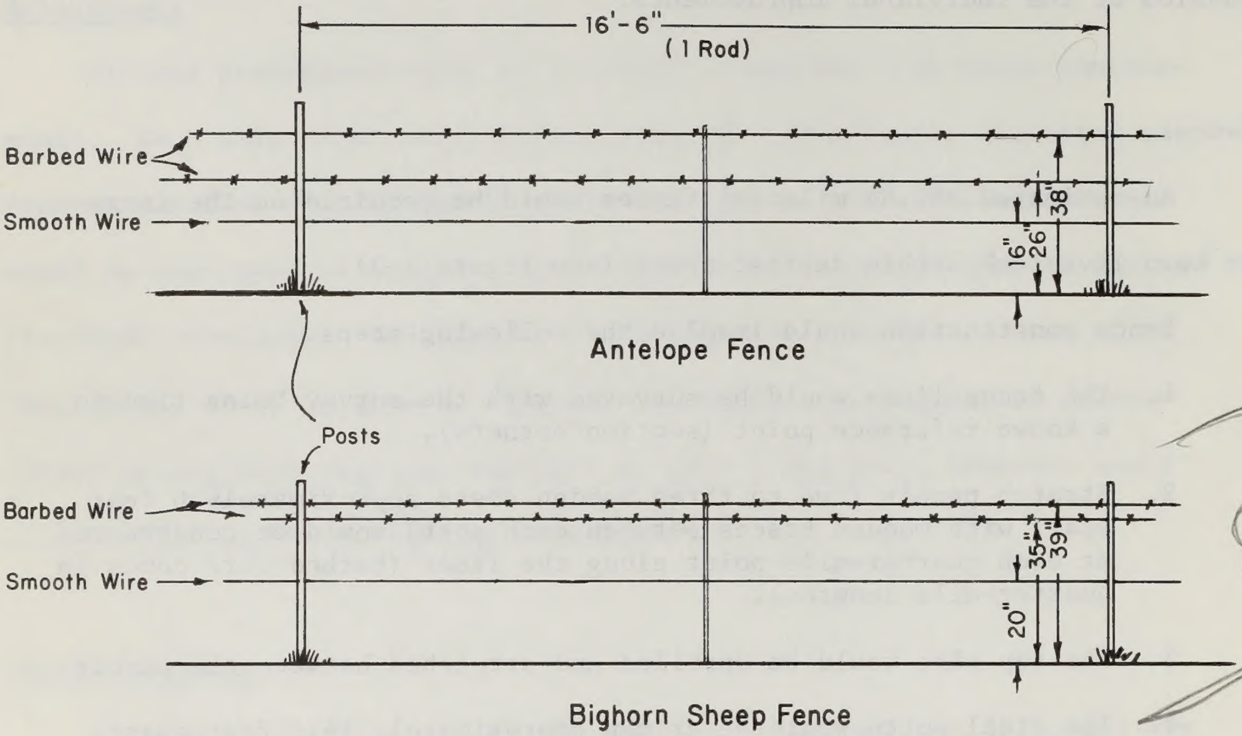


Figure I-3. Typical fences

strands of wire to meet the standard fence specifications. (See BLM Standard Fencing Specifications Design Features.)

1. All new fences would have at least one gate every mile and gates in every right-angle corner.
2. All wire gates would have an opening device.
3. The only right-of-way clearing that would be allowed is the hand limbing and the removing of an occasional tree that might be in direct alignment with the fence. The fence would be attached to living trees by placing a 4-foot section of a 2-by-6-inch board between the tree and the wire.
4. Division fences (pasture and boundary) would be built with barbed wire for the top two strands and smooth wire for the bottom strand to allow for the movement of big game.

5. For range not used by bighorn sheep, the following spacing would be used for the fence wires (antelope-type fencing): bottom wire, 16 inches above the ground; middle wire, 26 inches above ground; and top wire, 38 inches above ground.

6. For range used by bighorn sheep, the following dimensions for wire spacing would be followed: bottom wire, 20 inches above ground; middle wire, 35 inches above ground; and top wire, 39 inches above ground.

Boundary Markers. Approximately 2,293 boundary markers would be used to identify unfenced allotment and pasture boundaries (see figure I-4). These allotments would be grazed by sheep controlled with herders. This identification of pasture boundaries would give sheep herders specific instructions as to which pastures were to be rested and which pastures were to be grazed. Steel posts measuring 5.5 feet, with a 6-by-8-inch marker, would be driven into the ground on the boundaries. The distance between posts would be based on line of sight, but would not exceed one-quarter of a mile. An estimated 229.3 acres of surface disturbance would occur during construction of the boundary markers by two or three off-road vehicle trips.

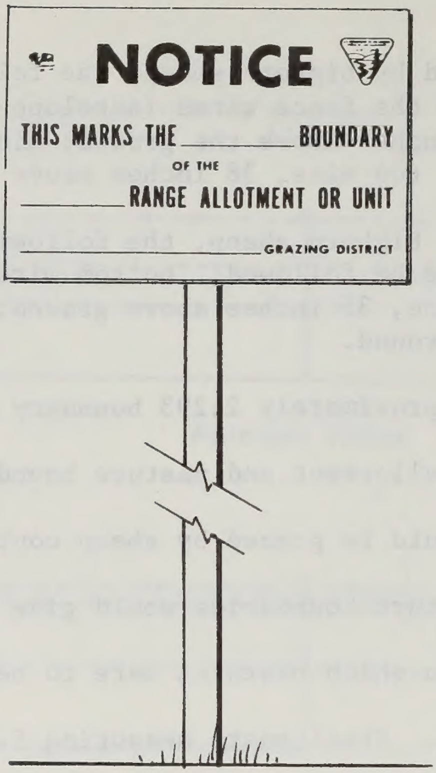

NOTICE
THIS MARKS THE ________ BOUNDARY
OF THE
________ RANGE ALLOTMENT OR UNIT
________ GRAZING DISTRICT

Figure I-4. Typical boundary marker

Cattleguards

Cattleguard construction would involve the excavation of a hole approximately 8 feet wide, 12 feet long, and 24 inches deep (see figure I-5). A precast concrete base would be set into the excavation, and earth would be backfilled and compacted around the base so that the excavation would remain in the middle of the base. A metal grid with openings large enough to keep animals from walking across but close enough to allow vehicles to drive over would be set onto the base so that the grid would not move. A gate would be placed to one side of the cattlegrard so livestock could be moved through the fence. In addition, extremely heavy loads or wide loads could be taken through

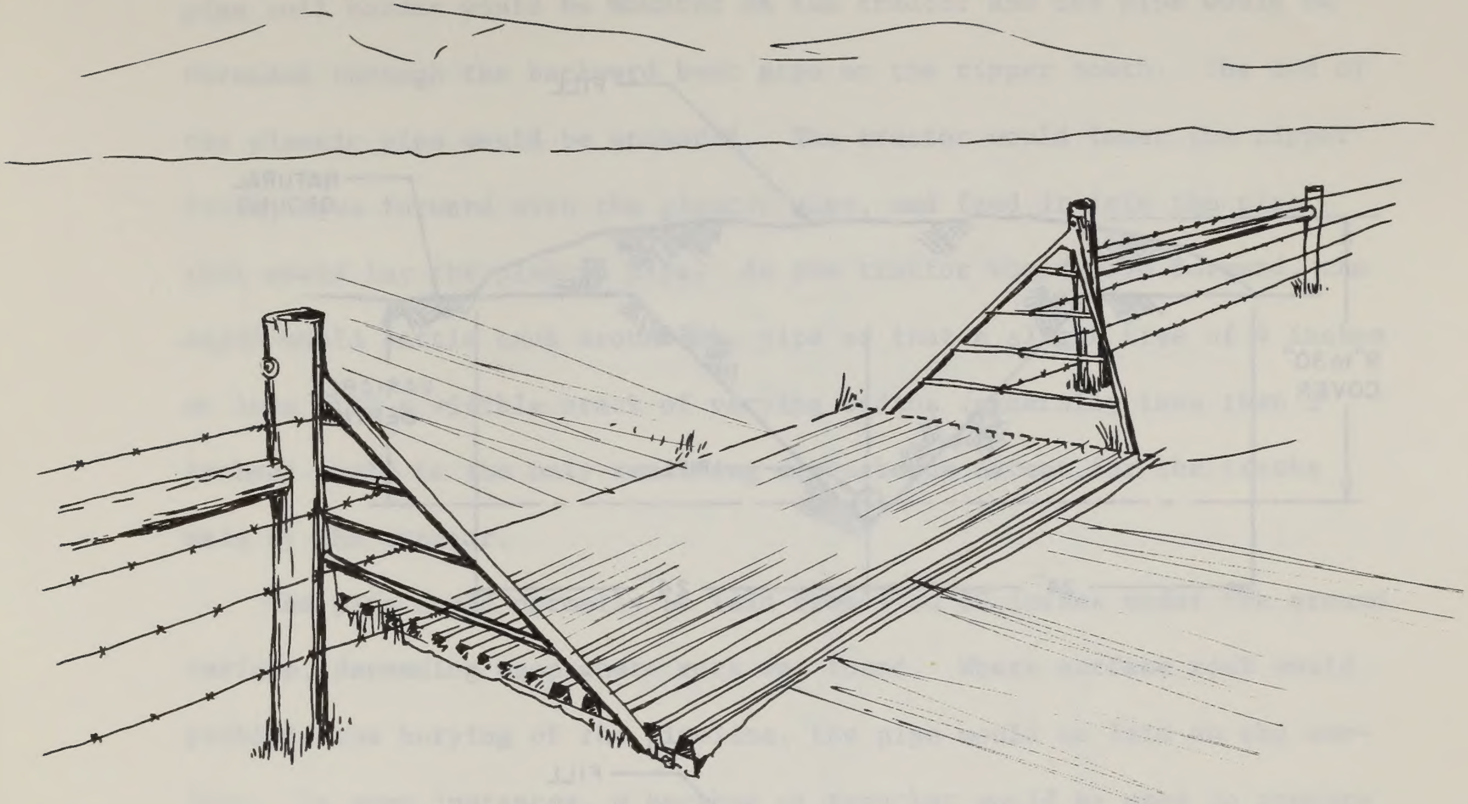


Figure I-5. Typical cattleguard

the gate rather than over the cattleguards, which would be built with a 15-to-20-ton load limit. Twenty-one cattleguards are proposed to be constructed, disturbing an estimated 2.1 acres.

Pipelines

An estimated 155.62 miles of pipelines would be needed to carry water from a source (well, stream, spring, and/or catchment) to an area where drinking water would not be available to livestock (see figure I-6). Generally, 1¼-inch diameter plastic pipe would be used and would be buried with a pipe-laying device mounted on a tractor.

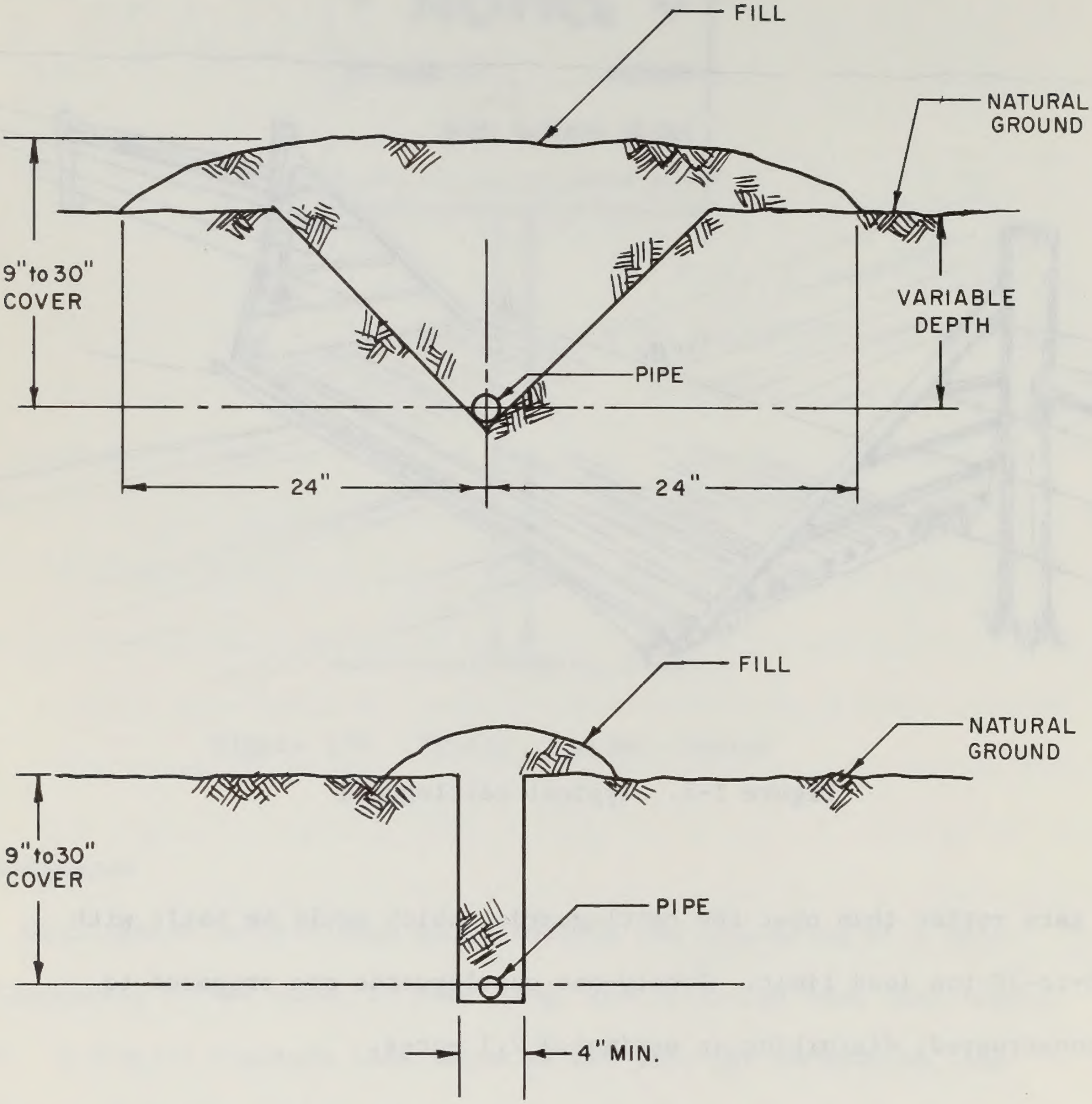


Figure I-6. Pipeline right-of-way (after pipe has been laid)

The pipe-laying device would be a "ripper tooth," less than 4 inches wide with a forward curve which would help hold the end of the tooth at the desired depth. A pipe of 3 to 4 inches in diameter would be welded to the backside of the ripper tooth and would curve outward to the tractor. A pipe roll holder would be mounted on the tractor and the pipe would be threaded through the backward bent pipe on the ripper tooth. The end of the plastic pipe would be anchored. The tractor would lower the ripper tooth, move forward with the plastic pipe, and feed it into the pipe that would lay the plastic pipe. As the tractor would move forward, the earth would settle back around the pipe so that a slight rise of 4 inches or less with a visible crack of varying widths (generally less than 2 inches) would be the only remaining disturbance except for the tracks made by the tractor.

The pipe would normally be laid from 9 to 30 inches under the ground surface, depending upon where rock was found. Where surface rock would prohibit the burying of the pipeline, the pipe would be laid on the surface. In some instances, a backhoe or trencher would be used to prepare the trench for the pipeline.

For pipeline installations, no right-of-way clearing or road construction would be permitted except for the removal of an occasional tree that could not be bypassed. An estimated 31.1 acres of surface disturbance would occur during construction.

Wells

Twenty-two wells would be constructed by drilling a hole with a diameter ranging from 4 to 8 inches and with a depth ranging from 100 to 800 feet (see figure I-7). Each well would be cased to prevent cave-ins. Various types of pumps would be used to bring water to the surface--windmills, submersible pumps, and pump jack piston types. Well sites would be fenced; the enclosures, however, would not exceed one-half of an acre.

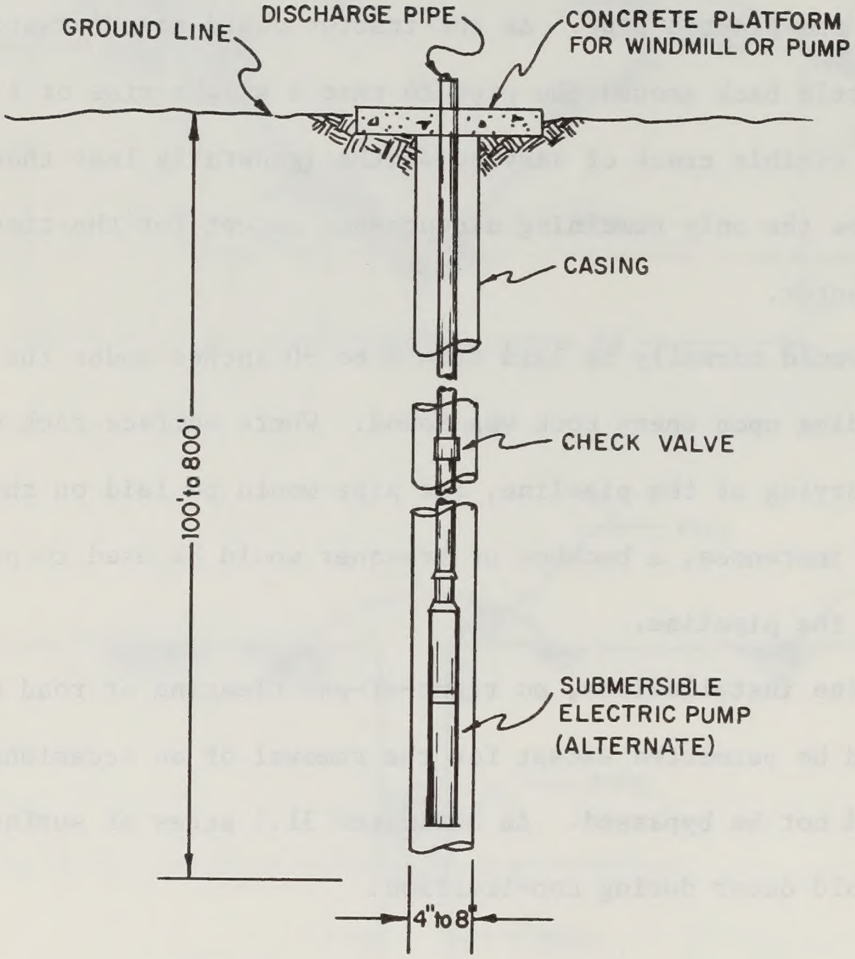

GROUND LINE
DISCHARGE PIPE
CONCRETE PLATFORM FOR WINDMILL OR PUMP
CASING
CHECK VALVE
100' to 800'
SUBMERSIBLE ELECTRIC PUMP (ALTERNATE)
4" to 8"

Figure I-7. Typical well

Power sources for the powered pumps would be electricity, diesel fuel, gasoline, and/or compressed gas. Electricity would be used only when a well site is located at a power line. Surface disturbance of an estimated 4.4 acres would occur during construction.

Water Storage Tanks

Storage facilities would be placed at predetermined areas, and a pipeline would be attached to them (see figure I-8). These facilities would be made out of metal and their size would be determined by the number of animals requiring water from the source. Generally, the tanks would be enclosed and would measure 15 to 30 feet in diameter and 6 to 12 feet high. Water would drain from the bottom of the storage facility, and the outside of the facility would be painted a color that would blend with the surrounding landscape so as to lessen the visual impact. An estimated 3.6 acres of surface disturbance would occur with the proposed 21 storage tanks.

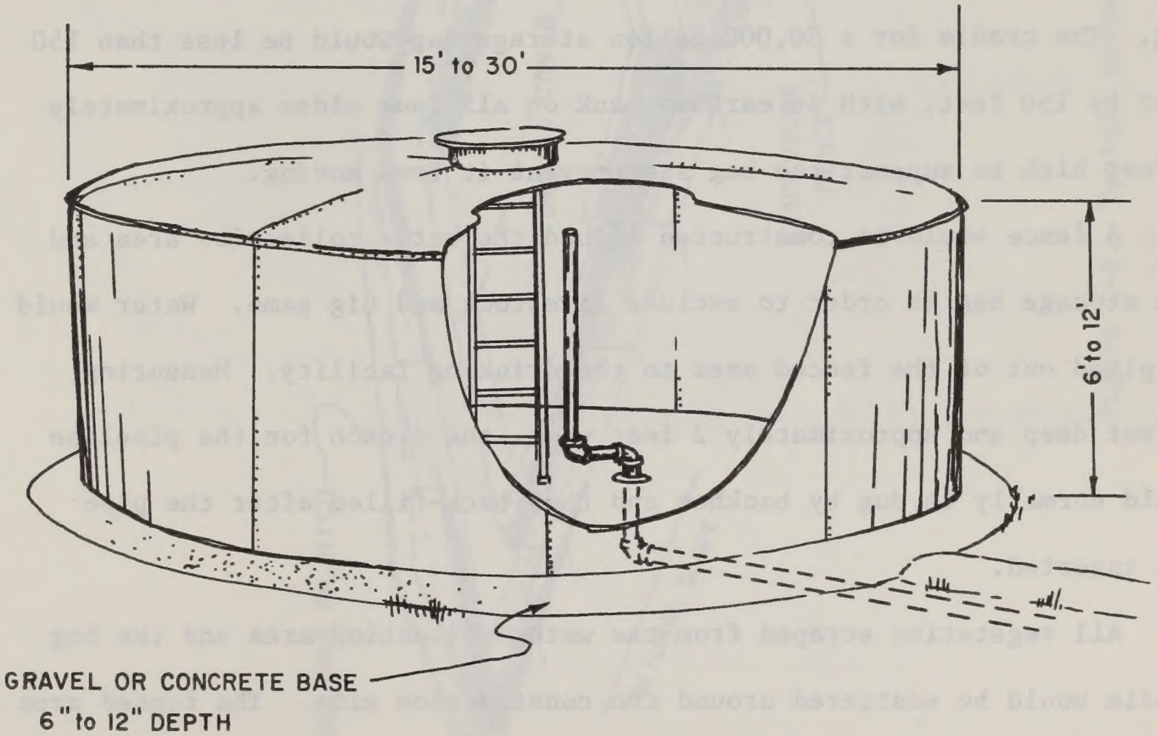


Figure I-8. Typical storage tank

Rainfall Catchments

Catchments would consist of a collection area made from an impervious material designed to collect rainfall (see figure I-9). The collected rainfall would be piped into a storage facility and then piped into a drinking facility for the animals. The size of the collection area and the storage facility would be determined by average annual rainfall and water requirements. For example, a 100-foot-square collection area that would receive a 9-inch annual average rainfall would yield 56,200 gallons of water per year.

From the catchment structure water would be piped into a storage facility, which would usually be a large butyl rubber bag. The bag would be placed in an earthen pit (cradle), which had been dug and shaped with a track-type tractor and cleared of any objects that could puncture the bag. The cradle for a 50,000 gallon storage bag would be less than 150 feet by 150 feet, with an earthen bank on all four sides approximately 3 feet high to support the bag and prevent it from moving.

A fence would be constructed around the water collection area and the storage bag in order to exclude livestock and big game. Water would be piped out of the fenced area to the drinking facility. Measuring 3 feet deep and approximately 2 feet wide, the trench for the pipeline would normally be dug by backhoe and then back-filled after the pipe was inserted.

All vegetation scraped from the water collecting area and the bag cradle would be scattered around the construction site. The fenced area would generally enclose one acre or less. Surface disturbance would affect approximately 3.0 acres. Six catchments are proposed.

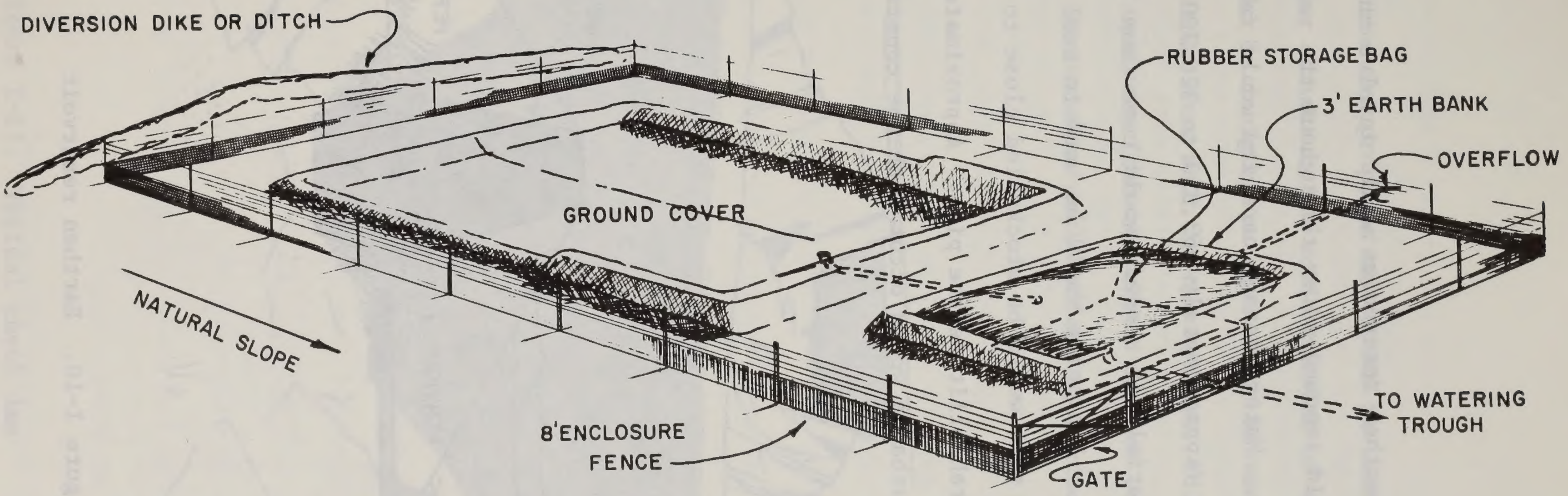


Figure I-9. Typical rainwater harvesting catchment

Earthen Reservoirs

Development of earthen reservoirs would involve the construction of a pit or dam that would impound water throughout the year for livestock use (see figure I-10). Water storage capacity would range from 0.5 acre-foot to 1.0 acre-foot (approximately 163,350 to 326,700 gallons per reservoir). Fill material, if needed, would come from the impoundment area or a borrow area. Bentonite would be used to seal the reservoir to prevent seepage. Top soil would be stockpiled close to the borrow pits and would be used to rehabilitate the pits. Approximately four to nine acres of surface disturbance would occur with the construction of the 46 proposed reservoirs.

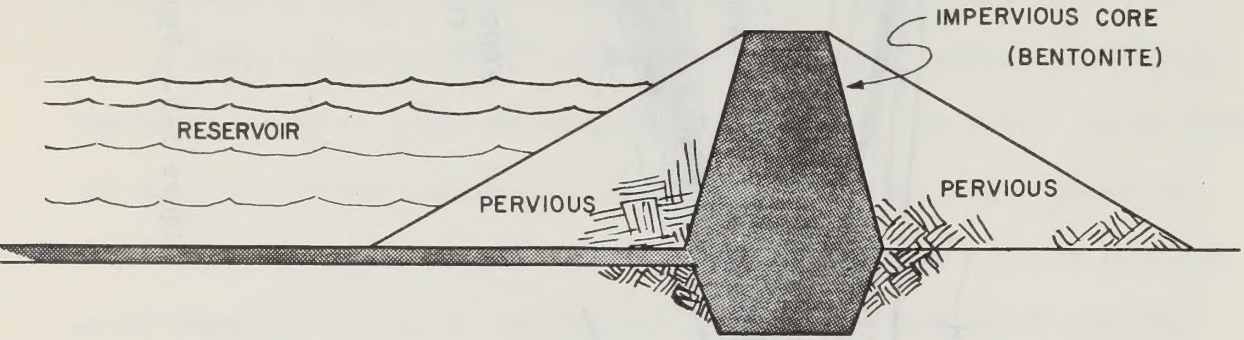


Figure I-10. Earthen reservoir

Check Dams

Forty-six check dams are proposed and would be used for erosion control (see figure I-11). Construction would consist of an earthen dam with a spillway, which would be designed to slow water movement after an intense rainfall or during a rapid snow melt in the spring. Fill material would be taken from streambeds upstream from the check dam and would average 1,000 cubic yards. Surface disturbance would affect approximately four to nine acres.

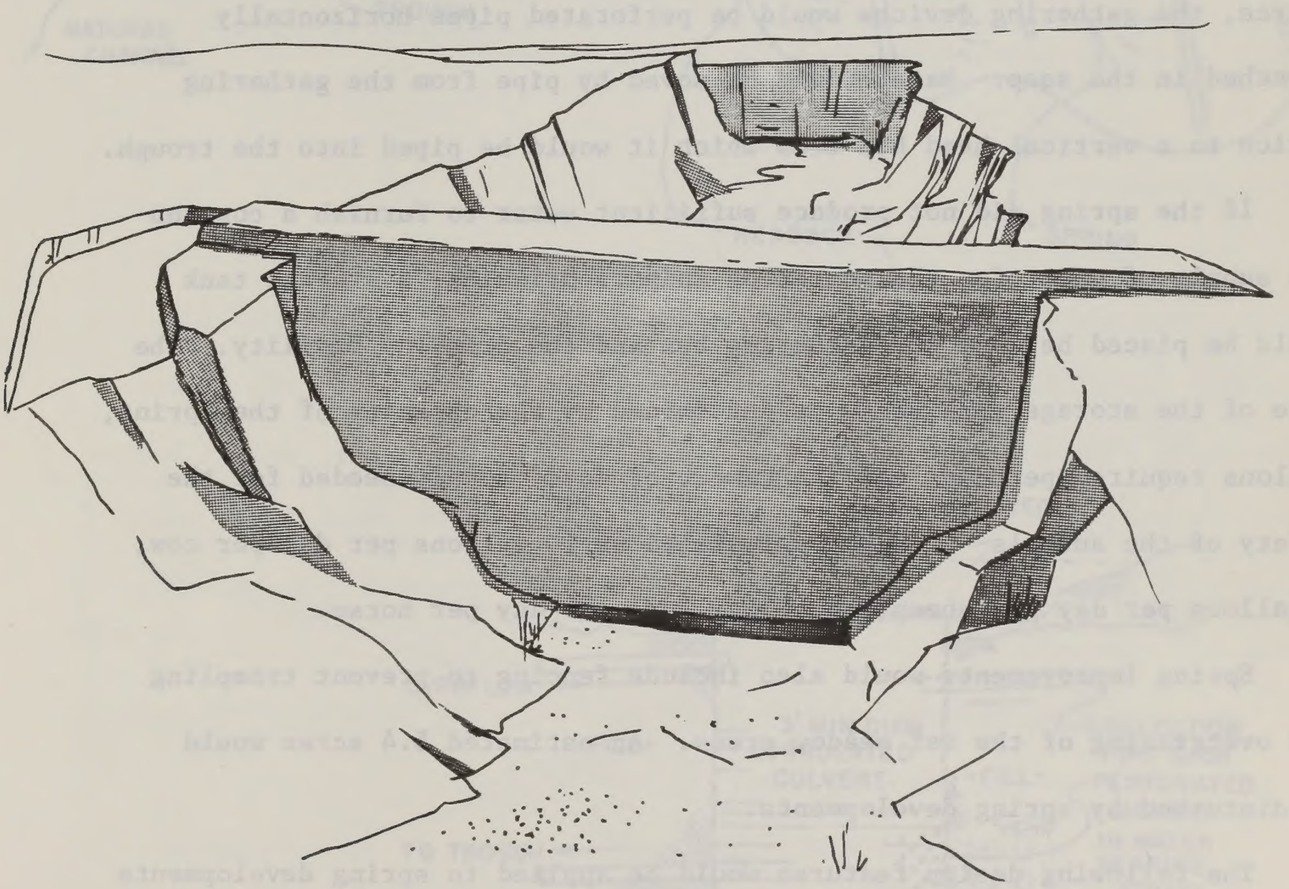


Figure I-11. Typical check dam

Springs

Twenty-seven springs are proposed to be developed. For a spring that would produce as a point discharge, the normal development procedure would be to excavate a hole with a backhoe. The hole would usually be 5' X 5' X 5' (see figure I-12). A vertical perforated pipe would be inserted and would function as a collection box. Water would be piped in a small-diameter (generally 1¼ inches) plastic pipe from the box to the trough. For sites where the water seeps from a larger area instead of a point source, the gathering devices would be perforated pipes horizontally trenched in the seep. Water would be moved by pipe from the gathering device to a vertical head box from which it would be piped into the trough.

If the spring did not produce sufficient water to furnish a continuous supply of water for the number of animals drinking, a storage tank would be placed between the gathering box and the drinking facility. The size of the storage tank would be determined by the capacity of the spring, gallons required per day, and the number of days' supply needed for the safety of the animals--a supply calculated as 10 gallons per day per cow, 3 gallons per day per sheep, and 12 gallons per day per horse.

Spring improvements would also include fencing to prevent trampling and overgrazing of the wet meadow areas. An estimated 5.4 acres would be disturbed by spring developments.

The following design features would be applied to spring developments in the San Luis Resource Area.

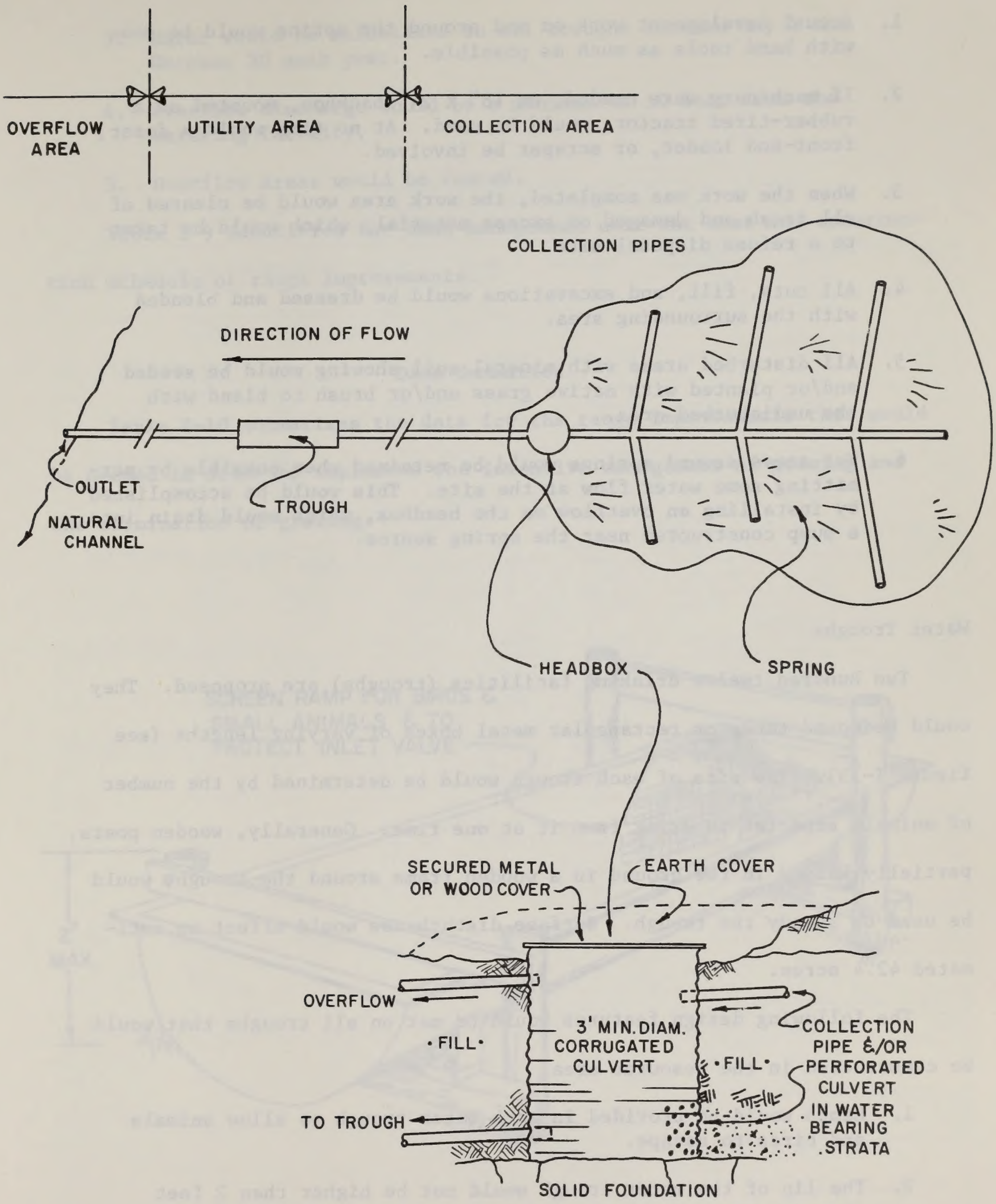


Figure I-12. Typical spring development

1. Actual development work on and around the spring would be done with hand tools as much as possible.
2. If machinery were needed, an 18" X 24" backhoe, mounted on a rubber-tired tractor, would be used. At no time would a dozer, front-end loader, or scraper be involved.
3. When the work was completed, the work area would be cleared of all trash and damaged or excess material, which would be taken to a refuse disposal site.
4. All cuts, fill, and excavations would be dressed and blended with the surrounding area.
5. All disturbed areas with mineral soil showing would be seeded and/or planted with native grass and/or brush to blend with the undisturbed area.
6. Wet areas around springs would be retained when possible by permitting some water flow at the site. This would be accomplished by installing an overflow on the headbox, which would drain into a sump constructed near the spring source.

Water Troughs

Two hundred twelve drinking facilities (troughs) are proposed. They would be round tanks or rectangular metal boxes of varying lengths (see figure I-13). The size of each trough would be determined by the number of animals expected to drink from it at one time. Generally, wooden posts, partially buried in the ground in a wooden frame around the trough, would be used to steady the trough. Surface disturbance would affect an estimated 42.4 acres.

The following design features would be met on all troughs that would be constructed in the resource area.

1. Ramps would be provided in each water trough to allow animals and birds to escape.
2. The lip of the water trough would not be higher than 2 feet above the ground, when possible, to allow antelope and deer fawns to water.

3. Water would be maintained in all troughs between May 1 and October 30 each year.

4. Overflow discharge would be a minimum of 50 feet from the watering facility.

5. Overflow areas would be fenced.

Table 1-9 identifies for each management unit the cost and construction schedule of range improvements.

Data Summation

Table I-10 summarizes the data for the range improvements that would be needed in order to implement the intensive management of grazing and the elimination of grazing.

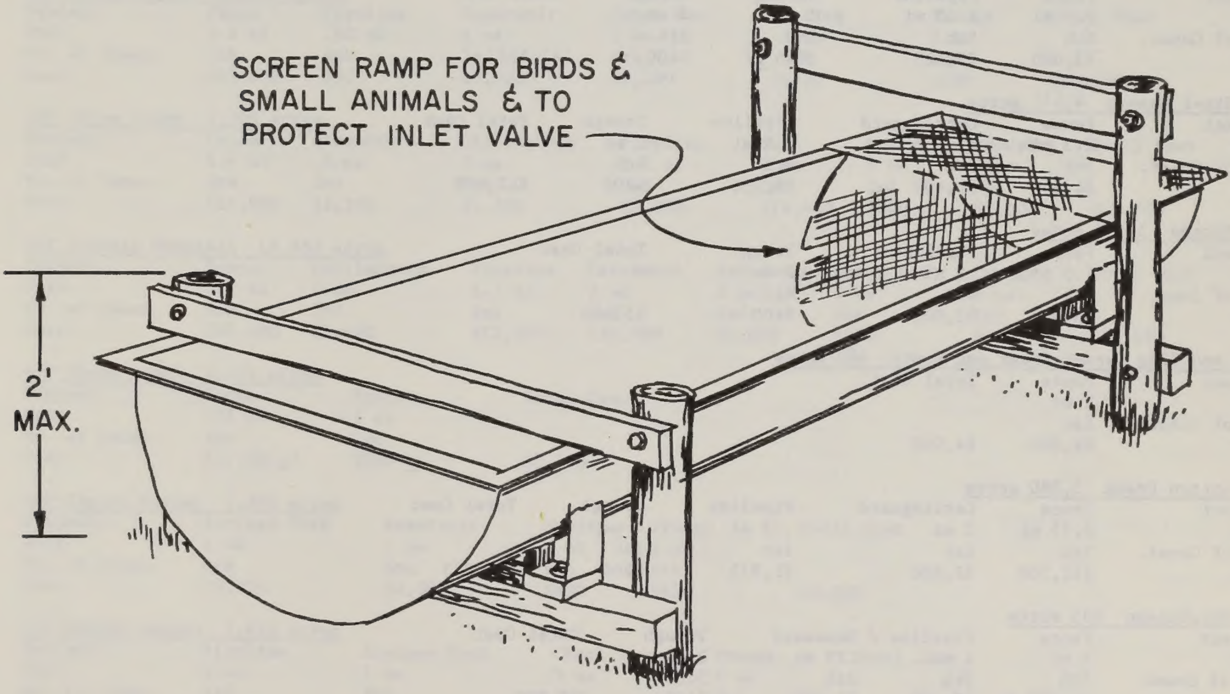

SCREEN RAMP FOR BIRDS & SMALL ANIMALS & TO PROTECT INLET VALVE
2' MAX.

Figure I-13. Typical drinking trough

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS
(by Management Unit)

1P Poncha Pass West 1,925 acres a/

Project	Fence	Cattleguard	Pipeline	Spring	Trough	Total Cost
Units	3.1 mi	2 ea	.53 mi	1 ea	3 ea	
Yr. of Const. b/	1st	1st	1st	1st	1st	
Cost	$6,200	$2,800	$1,320	$800	$600	$11,520

11P Kerber Creek 4,500 acres

Project	Fence	Pipeline	Reservoir	Trough	Total Cost
Units	19.5 mi	.75 mi	1 ea	2 ea	
Yr. of Const.	6th	5th	5th	5th	
Cost	$39,000	$1,875	$2,000	$400	$43,275

15P Nye 1,460 acres

Project	Fence	Pipeline /	Easement	Trough	Total Cost
Units	.96 mi	.75 mi	.75 mi	1 ea	
Yr. of Const.	6th	6th	4th	6th	
Cost	$1,920	$1,875	$3,000	$200	$6,995

16P East & West San Luis Creek 2,740 acres

Project	Fence	Cattleguard	Pipeline	Well	Trough	Total Cost
Units	4.2 mi	2 ea	.4 mi	1 ea	2 ea	
Yr. of Const.	4th	4th	4th	3rd	4th	
Cost	$8,400	$1,400	$1,000	$9,700	$400	$22,300

22P Piney Creek 2,510 acres

Project	Fence	Pipeline	Spring	Trough	Total Cost
Unit	1.5 mi	1.25 mi	1 ea	2 ea	
Yr. of Const.	5th	5th	5th	5th	
Cost	$3,000	$3,125	$800 c/	$400	$7,325

23P Steel Canyon 4,472 acres

Project	Fence	Cattleguard	Pipeline	Trough	Total Cost
Unit	2.3 mi	1 ea	2.5 mi	2 ea	
Yr. of Const.	5th	5th	4th	4th	
Cost	$4,600	$1,400	$6,250	$400	$12,650

24P Mirage 2,395 acres

Project	Fence	Pipeline	Trough	Total Cost
Unit	1.5 mi	.8 mi	2 ea	
Yr. of Const.	5th	4th	4th	
Cost	$3,000	$2,000	$400	$5,400

26Eg and 27Eg Garner Creek and South 680 acres

Project	Fence	Total Cost
Unit	2 mi	
Yr. of Const.	1st	
Cost	$4,000	$4,000

28P Cotton Creek 3,880 acres

Project	Fence	Cattleguard	Pipeline	Trough	Total Cost
Unit	5.75 mi	2 ea	.75 mi	1 ea	
Yr. of Const.	1st	1st	1st	1st	
Cost	$11,500	$2,800	$1,875	$200	$16,375

31P Hutchinson 835 acres

Project	Fence	Pipeline /	Easement	Trough	Total Cost
Unit	1 mi	1 mi	.25 mi	2 ea	
Yr. of Const.	5th	5th	4th	5th	
Cost	$2,000 d/	$2,500	$1,000	$400	$5,900

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a/ Acres in table represent national resource lands.
b/ Year of construction is based on an eight-year schedule of implementation.
c/ Allottee would provide material and labor for this improvement.
d/ Allottee would provide labor for this improvement.

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS (cont.)
(by Management Unit)

34P Mineral Hot Springs 10,260 acres

Project	Pipeline	Trough	Total Cost
Unit	8 mi	9 ea	
Yr. of Const.	4th	4th	
Cost	$20,000	$1,800	$21,800

36P McIntyre Gulch 4,602 acres

Project	Fence	Spring	Trough	Total Cost
Unit	2 mi	2 ea	2 ea	
Yr. of Const.	2nd	1st	1st	
Cost	$4,000	$1,600	$400	$6,000

39P Findley Gulch 11,345 acres

Project	Fence	Pipeline	Well	Spring	Trough	Total Cost
Unit	.6 mi	13 mi	1 ea	1 ea	15 ea	
Yr. of Const.	3rd	3rd	2nd	2nd	3rd	
Cost	$1,200	$32,500	$9,700	$800	$3,000	$47,200

41P Laughlin Gulch 6,643 acres

Project	Fence (new)	Fence (repair)	Fence (removal)	Pipeline	Spring	Trough	Total Cost
Unit	1.3 mi	.75 mi	.38 mi	1 mi	1 ea	2 ea	
Yr. of Const.	6th	6th	6th	6th	5th	6th	
Cost	$2,600	$750	$760	$2,500	$800	$400	$7,810

42P Poison Gulch 14,357 acres

Project	Fence	Pipeline	Reservoir	Check Dam	Spring	Trough	Total Cost
Unit	6.5 mi	.02 mi	1 ea	3 ea	1 ea	1 ea	
Yr. of Const.	4th	4th	3rd	4th	3rd	4th	
Cost	$13,000	$50	$2,000	$4,100	$800	$200	$20,150

45P Cross Creek 6,305 acres

Project	Fence /	Easement	Cattleguard	Pipeline	Well	Spring	Trough	Total Cost
Unit	6.4 mi	.5 mi	3 ea	1.2 mi	2 ea	1 ea	5 ea	
Yr. of Const.	3rd	2nd	3rd	3rd	2nd	2nd	3rd	
Cost	$12,800	$2,500	$4,200	$3,000	$19,400	$800	$1,000	$43,700

46P Trickle Mountain 19,562 acres

Project	Fence	Cattleguard	Pipeline	Catchment	Reservoir	Check Dam	Trough	Total Cost
Unit	6.4 mi	1 ea	1.5 mi	2 ea	2 ea	1 ea	3 ea	
Yr. of Const.	3rd	3rd	2nd	2nd	2nd	3rd	3rd	
Cost	$12,000	$1,400	$12,000	$32,000	$4,000	$100	$600	$54,650

47P Sheep Creek 2,031 acres

Project	Fence	Spring	Total Cost
Unit	.75 mi	1 ea	
Yr. of Const.	1st	1st	
Cost	$1,500 c/	$800 c/	$2,300

48P Taylor Canyon 2,902 acres

Project	Storage Tank	Reservoir	Spring	Trough	Total Cost
Unit	1 ea	1 ea	1 ea	2 ea	
Yr. of Const.	6th	6th	6th	6th	
Cost	$6,000	$2,000	$800	$400	$9,200

50P Rabbit Canyon 3,835 acres

Project	Pipeline	Storage Tank	Check Dam	Trough	Total Cost
Unit	2 mi	1 ea	5 ea	2 ea	
Yr. of Const.	3rd	3rd	3rd	3rd	
Cost	$5,000	$5,000	$1,000	$400	$11,400

52P Hat Springs 4,564 acres

Project	Fence	Pipeline	Spring	Trough	Total Cost
Unit	1.25 mi	1.5 mi	1 ea	2 ea	
Yr. of Const.	6th	6th	6th	6th	
Cost	$2,500	$3,750	$800	$400	$7,450

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS (cont.)
(by Management Unit)

55P Mill Hill 4,167 acres

Project	Fence	Pipeline	Well	Trough	Total Cost
Unit	3 mi	3 mi	1 ea	4 ea	
Yr. of Const.	2nd	2nd	1st	2nd	
Cost	$6,000	$7,500	$9,600	$800	$23,900

56P Higgins Spring 753 acres

Project	Fence	Reservoir	Spring	Trough	Total Cost
Unit	.5 mi	1 ea	1 ea	2 ea	
Yr. of Const.	5th	5th	5th	5th	
Cost	$1,000	$2,000	$800	$400	$4,200

58P West Tracy Ridge 925 acres

Project	Spring	Total Cost
Unit	1 ea	
Yr. of Const.	1st	
Cost	$800	$800

60P Tracy Cattlemen's 27,749 acres

Project	Fence	Cattleguard	Pipeline	Trough	Total Cost
Unit	12.5 mi	4 ea	7.6 mi	6 ea	
Yr. of Const.	4th	4th	3rd	3rd	
Cost	$25,000	$5,600	$19,000	$1,200	$50,800

63P Biedell Creek 2,462 acres

Project	Fence	Cattleguard	Pipeline	Reservoir	Spring	Trough	Total Cost
Unit	2.6 mi	2 ea	.4 mi	1 ea	1 ea	3 ea	
Yr. of Const.	1st	1st	1st	1st	1st	1st	
Cost	$5,200	$2,800	$1,000	$2,500	$800	$600	$12,900

64P East of Carnero Creek 11,849 acres

Project	Fence	Cattleguard	Pipeline	Reservoir	Spring	Trough	Total Cost
Unit	12 mi	2 ea	4.4 mi	3 ea	3 ea	8 ea	
Yr. of Const.	2nd	2nd	1st	2nd	1st	1st	
Cost	$24,000	$2,800	$11,000	$6,000	$2,400	$1,600	$47,800

69P Elephant Rocks 3,517 acres

Project	Boundary Marker	Total Cost
Unit	55 ea	
Yr. of Const.	4th	
Cost	$275	$275

70P Rio Grande Canal 4,360 acres

Project	Boundary Marker	Pipeline	Well	Storage Tank	Trough	Total Cost
Unit	60 ea	3 mi	1 ea	1 ea	4 ea	
Yr. of Const.	3rd	3rd	2nd	3rd	3rd	
Cost	$300	$7,500	$9,700	$4,000	$800	$22,350

73P Alder Creek 275 acres

Project	Pipeline	Pump	Trough	Total Cost
Unit	.5 mi	1 ea	1 ea	
Yr. of Const.	6th	6th	6th	
Cost	$1,250	$2,000	$200	$3,450

76P Sanderson 510 acres

Project	Pipeline /	Easement	Spring	Trough	Total Cost
Unit	.75 mi	.25 mi	1 ea	1 ea	
Yr. of Const.	1st	1st	1st	1st	
Cost	$1,875	$1,000	$800	$200	$3,875

79P Branch 2,457 acres

Project	Fence (new)	Fence (repair)	Storage Tank	Trough	Total Cost
Unit	3.5 mi	4.5 mi	2 ea	2 ea	
Yr. of Const.	7th	7th	7th	7th	
Cost	$7,000	$4,500	$8,000	$400	$19,900

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS (cont.)
(by Management Unit)

80P Pup Peak 5,002 acres

Project	Fence	Boundary Marker	Pipeline	Storage Tank	Check Dam	Trough	Total Cost
Unit	1.60 mi	200 ea	6 mi	1 ea	12 ea	8 ea	
Yr. of Const.	2nd	2nd	2nd	2nd	2nd	2nd	
Cost	$3,200	$1,000	$15,000	$4,000	$1,700	$1,600	$26,000

81P Limekiln 5,050 acres

Project	Boundary Marker	Pipeline	Well	Storage Tank	Reservoir	Check Dam	Trough	Total Cost
Unit	200 ea	4.5 mi	1 ea	2 ea	1 ea	10 ea	10 ea	
Yr. of Const.	2nd	2nd	1st	2nd	2nd	2nd	2nd	
Cost	$1,000	$11,250	$10,800	$8,000	$2,100	$1,000	$2,000	$36,150

82P Nicomodes 3,080 acres

Project	Fence	Boundary Marker	Pipeline	Check Dam	Trough	Total Cost
Unit	2.23 mi	20 ea	2 mi	5 ea	2 ea	
Yr. of Const.	4th	4th	4th	4th	4th	
Cost	$3,460	$100	$5,000	$500	$400	$10,460

83P Raton Creek 3,940 acres

Project	Fence	Pipeline	Spring	Trough	Total Cost
Unit	1.75 mi	1.5 mi	1 ea	1 ea	
Yr. of Const.	6th	6th	5th	6th	
Cost	$3,500	$3,750	$800	$200	$8,250

84P Rock Creek 12,680 acres

Project	Boundary Marker	Pipeline/Easement		Well	Storage Tank	Reservoir	Check Dam	Spring	Trough	Total Cost
Unit	200 ea	9.5 mi	.75 mi	2 ea	2 ea	3 ea	10 ea	1 ea	8 ea	
Yr. of Const.	2nd	2nd	1st	1st	2nd	2nd	2nd	1st	2nd	
Cost	$1,000	$23,750	$3,000	$24,500	$8,000	$6,000	$1,000	$800	$1,600	$69,500

85P McMahon 15,016 acres

Project	Boundary Marker	Pipeline	Spring	Trough	Total Cost
Unit	150 ea	1.75 mi	1 ea	2 ea	
Yr. of Const.	6th	6th	5th	6th	
Cost	$750	$4,375	$800	$400	$6,325

86P Greenie Mountain 8,114 acres

Project	Boundary Marker	Pipeline	Well	Storage Tank	Trough	Total Cost
Unit	500 ea	2.25 mi	1 ea	1 ea	3 ea	
Yr. of Const.	3rd	3rd	2nd	3rd	3rd	
Cost	$2,500	$5,625	$12,100	$4,000	$600	$24,825

87P Gato-Hutchinson 1,960 acres

Project	Boundary Marker	Reservoir	Total Cost
Unit	300 ea	1 ea	
Yr. of Const.	1st	1st	
Cost	$1,500	$1,000	$2,500

88P Triangle 3,715 acres

Project	Boundary Marker	Reservoir	Total Cost
Unit	100 ea	1 ea	
Yr. of Const.	2nd	2nd	
Cost	$500	$3,000	$3,500

89P Alamosa River 760 acres

Project	Boundary Marker	Total Cost
Unit	30 ea	
Yr. of Const.	7th	
Cost	$150	$150

93P Posito Creek 4,991 acres

Project	Fence	Pipeline	Reservoir	Trough	Total Cost
Unit	4.75 mi	2.75 mi	1 ea	2 ea	
Yr. of Const.	7th	6th	6th	6th	
Cost	$9,500	$6,875	$2,000	$400	$18,775

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS (cont.)
(by Management Unit)

94P Jadero Flat 5,200 acres

Project	Boundary Marker	Total Cost
Unit	20 ea	
Yr. of Const.	1st	
Cost	$100	$100

95P Poso Creek 2,240 acres

Project	Boundary Marker	Total Cost
Unit	25 ea	
Yr. of Const.	6th	
Cost	$125	$125

96P Capulin 5,589 acres

Project	Boundary Marker	Pipeline	Well	Trough	Total Cost
Unit	30 ea	2.5 mi	1 ea	3 ea	
Yr. of Const.	4th	4th	3rd	4th	
Cost	$150	$6,250	$9,700	$600	$16,700

97P Romero Canyon 1,730 acres

Project	Fence	Reservoir	Total Cost
Unit	1.75 mi	2 ea	
Yr. of Const.	2nd	2nd	
Cost	$3,500	$3,000	$6,500

98P Ra Jadero Canyon 6,730 acres

Project	Fence	Cattleguard	Pipeline	Catchment	Reservoir	Spring	Trough	Total Cost
Unit	20 mi	2 ea	3.5 mi	1 ea	4 ea	1 ea	4 ea	
Yr. of Const.	2nd	2nd	2nd	1st	1st	1st	2nd	
Cost	$40,000	$2,800	$8,750	$20,000	$8,000	$800	$800	$81,150

99P Cinder Pits 15,370 acres

Project	Fence	Pipeline	Well	Storage Tank	Catchment	Reservoir	Trough	Total Cost
Unit	19 mi	11 mi	1 ea	2 ea	1 ea	2 ea	12 ea	
Yr. of Const.	2nd	2nd	1st	2nd	1st	1st	2nd	
Cost	$38,000	$27,500	$14,000	$8,000	$16,000	$2,000	$2,400	$107,900

106P Little Mogotes 13,510 acres

Project	Fence	Pipeline	Well	Storage Tank	Catchment	Reservoir	Trough	Total Cost
Unit	24 mi	12 mi	1 ea	1 ea	2 ea	2 ea	14 ea	
Yr. of Const.	2nd	2nd	2nd	2nd	1st	1st	2nd	
Cost	$48,000	$30,000	$25,000	$4,000	$32,000	$7,000	$2,800	$148,800

107P Grande 3,950 acres

Project	Boundary Marker	Reservoir	Total Cost
Unit	30 ea	3 ea	
Yr. of Const.	5th	4th	
Cost	$150	$3,000	$3,150

108P Mogote Flat 1,977 acres

Project	Boundary Marker	Reservoir	Total Cost
Unit	203 ea	1 ea	
Yr. of Const.	3rd	2nd	
Cost	$1,015	$2,000	$3,015

109P Poso 5,240 acres

Project	Fence	Pipeline	Well	Storage Tank	Reservoir	Trough	Total Cost
Unit	4.5 mi	3 mi	1 ea	1 ea	1 ea	3 ea	
Yr. of Const.	4th	4th	3rd	4th	3rd	4th	
Cost	$9,000 d/	$7,500	$9,700 d/	$4,000	$1,000	$600	$31,800

110P Los Mogotes 7,514 acres

Project	Fence	Reservoir	Total Cost
Unit	12.5 mi	8 ea	
Yr. of Const.	3rd	2nd	
Cost	$25,000 d/	$11,000	$36,000

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS (cont.)
(by Management Unit)

111P Big Horn Creek 760 acres

Project	Fence	Total Cost
Unit	2 mi	
Yr. of Const.	1st	
Cost	$4,000	$4,000

112P Railroad 3,741 acres

Project	Boundary Marker	Pipeline	Total Cost
Unit	60 ea	.02 mi	
Yr. of Const.	2nd	2nd	
Cost	$300	$50	$350

113P Llano 5,261 acres

Project	Boundary Marker	Total Cost
Unit	50 ea	
Yr. of Const.	1st	
Cost	$250	$250

115P Alta Lake 11,446 acres

Project	Fence	Pipeline	Well	Storage Tank	Trough	Total Cost
Unit	6.7 mi	10 mi	2 ea	2 ea	9 ea	
Yr. of Const.	4th	4th	3rd	3rd	4th	
Cost	$11,240	$25,000	$23,200	$8,000	$1,800	$69,240

117P River 2,324 acres

Project	Fence	Pipeline	Trough	Total Cost
Unit	2.7 mi	1.75 mi	3 ea	
Yr. of Const.	7th	6th	6th	
Cost	$5,400	$4,375	$600	$10,375

118Eg Mondragon Individual 385 acres

Project	Fence	Total Cost
Unit	2 mi	
Yr. of Const.	2nd	
Cost	$4,000	$4,000

119P South Valley 1,800 acres

Project	Pipeline	Reservoir	Trough	Total Cost
Unit	.5 mi	2 ea	3 ea	
Yr. of Const.	6th	6th	6th	
Cost	$1,250	$4,000	$600	$5,850

120P Pinon 7,210 acres

Project	Fence	Boundary Marker	Pipeline /	Easement	Well	Storage Tank	Trough	Total Cost
Unit	3 mi	30 ea	5 mi	2 mi	1 ea	1 ea	4 ea	
Yr. of Const.	5th	5th	4th	3rd	3rd	4th	4th	
Cost	$6,000	$150	$12,500	$8,000	$10,700	$4,000	$800	$42,150

123P Eight Mile 5,640 acres

Project	Fence	Pipeline	Storage Tank	Reservoir	Trough	Total Cost
Unit	9.6 mi	4 mi	1 ea	2 ea	5 ea	
Yr. of Const.	5th	4th	4th	4th	4th	
Cost	$19,200	$10,000	$4,000	$2,500	$1,000	$36,700

124 Pinon Hills 9,274 acres

Project	Boundary Marker	Trough	Total Cost
Unit	30 ea	1 ea	
Yr. of Const.	5th	5th	
Cost	$150	$200	$350

125P Rio Grande Common 18,611 acres

Project	Fence (new)	Fence (removal)	Pipeline	Well	Storage Tank	Reservoir	Spring	Trough	Total Cost
Unit	30 mi	4 mi	8 mi	2 ea	3 ea	2 ea	1 ea	6 ea	
Yr. of Const.	4th	4th	3rd	2nd	3rd	2nd	2nd	3rd	
Cost	$60,000	$8,000	$20,000	$19,400	$15,000	$2,500	$800	$1,200	$126,900

TABLE I-9. COST AND CONSTRUCTION OF RANGE IMPROVEMENTS (cont.)
(by Management Unit)

126P La Sauses 3,200 acres

Project	Fence	Pipeline	Trough	Total Cost
Unit	4.9 mi	3 mi	4 ea	
Yr. of Const.	4th	4th	4th	
Cost	$9,800	$7,500	$800	$18,100

127Eg Saddleback Mountain 2,720 acres

Project	Fence	Cattleguard	Total Cost
Unit	.25 mi	1 ea	
Yr. of Const.	3rd	3rd	
Cost	$500	$1,400	$1,900

129P Rio Grande 2,975 acres

Project	Fence	Cattleguard	Pipeline	Well	Trough	Total Cost
Unit	3.25 mi	2 ea	1.5 mi	1 ea	2 ea	
Yr. of Const.	4th	4th	4th	3rd	4th	
Cost	$6,500	$2,100	$3,750	$11,600	$400	$24,430

132P Four Mile 320 acres

Project	Fence	Total Cost
Unit	3 mi	
Yr. of Const.	1st	
Cost	$1,400	$1,400

133P Tobin Creek 6,126 acres

Project	Fence (new)	Fence (repair)	Cattleguard	Pipeline	Well	Spring	Trough	Total Cost
Unit	1.75 mi	6.5 mi	1 ea	.5 mi	1 ea	1 ea	2 ea	
Yr. of Const.	3rd	3rd	3rd	3rd	3rd	3rd	3rd	
Cost	$3,500	$3,250	$1,400	$1,250	$9,700	$800	$400	$20,300

134P Foothills 4,700 acres

Project	Fence	Pipeline	Spring	Trough	Total Cost
Unit	2.5 mi	2.3 mi	3 ea	5 ea	
Yr. of Const.	1st	1st	1st	1st	
Cost	$5,000	$5,750	$2,400	$1,000	$14,150

137P Blanca 5,220 acres

Project	Fence (electric)	Fence (standard)	Pipeline	Trough	Total Cost
Unit	6.5 mi	.5 mi	.5 mi	4 ea	
Yr. of Const.	1st	1st	1st	1st	
Cost	$6,500	$1,000	$1,250	$800	$9,550

138P Dry Lakes 5,836 acres

Project	Fence	Pipeline	Well	Trough	Total Cost
Unit	2.5 mi	.2 mi	1 ea	5 ea	
Yr. of Const.	3rd	3rd	3rd	3rd	
Cost	$5,000	$500	$6,000	$1,000	$12,500

140Eg Park Pasture 400 acres

Project	Fence	Total Cost
Unit	1.25 mi	
Yr. of Const.	4th	
Cost	$2,500	$2,500

141P Zapata Falls 5,991 acres

Project	Fence	Pipeline	Trough	Total Cost
Unit	3.5 mi	1 mi	1 ea	
Yr. of Const.	7th	7th	7th	
Cost	$7,000	$2,500	$200	$9,700

TABLE I-10. SUMMATION OF RANGE IMPROVEMENTS

Range Improvement	Unit	Probable Completion (Year) 1	2	3	4	5	6	7	8	Total	Acres Disturbed per Unit Short-term	Long-term	Total Acres Disturbed Short-term	Long-term
Water Developments														
Wells	No.	5	8	9						22	.2	.1	4.4	2.2
Springs	No.	15	3	2		5	2			27	.2	.2	5.4	5.4
Catchments	No.	4	2							6	.5	.2	3.0	1.2
Pipelines	Miles	9.63	51.02	37.75	42.72	3.00	10.50	1.00		155.62	.2		31.1	
Easements	Miles	1.0		2.0	1.0					4.0				
Storage Tanks	No.		8	8	3			2		21	.2	.2	3.6	3.6
Water Troughs	No.	23	60	51	52	9	16	1		212	.2	.2	42.4	42.4
Reservoirs	No.	10	23	2	5	2	4			46	.1-.2	.1-.2	4-9	4-9
Fences														
Electric	Miles	6.5								6.5	.5	.1	3.3	0.7
New	Miles	22.20	85.35	30.40	76.03	19.40	24.76	14.45		272.59	.5	.1	136.3	27.3
Easements	Miles		0.5							0.5				
Removal	Miles				4.0		0.38			4.38	.1		4.4	
Repair	Miles			6.5			0.75	4.5		11.75	.1	.1	1.2	1.2
Boundary Markers	No.	370	760	763	105	90	175	30		2,293	.1		229.3	
Cattleguards	No.	6	4	3	7	1				21	.1	.1	2.1	2.1
Check Dams	No.		32	6	8					46	.1-.2	.1-.2	4-9	4-9
													485	104

Custodial Management of Grazing

Custodial management has been proposed for 39 allotments or portions of allotments in the San Luis Resource Area. These allotments have been identified by BLM resource specialists as having little or no resource value other than grazing by domestic livestock. This identification was supported by the public through participation in the Bureau's planning system. Figure I-2 (cover pocket) and table I-2 (pp.I-5 f.) indicate the specific allotments for which custodial management is proposed.

This component is proposed for 16,625 acres of NRL and consists of 673 AUMs, which constitutes no change in the present use levels of these management units. In most cases the allotments that would be involved are scattered parcels (tracts) of NRL, averaging 160 acres or less, that are surrounded by large tracts of private land. The management that would occur with custodial management would be (1) the Bureau's issuance of a permit, which would read: "___number____ AUMs of grazing use may be made on national resource lands concurrently with private and/or controlled lands as long as the grazing use is not harmful to the national resource lands"; (2) minimal supervision, primarily trespass control; and (3) the refusal of BLM to construct any new improvements. No specific objectives for renewable resources are proposed for those allotments that would be custodially managed.

Continuation of Unallotted Status

There are 19,900 acres of NRL that presently comprise 22 unallotted management units in the resource area. Unallotted status refers to land not committed to grazing. (See figure I-2 and table I-2, pp.I-5 f.)

Some of the unallotted units include previously allotted NRL for which the grazing privileges were canceled or relinquished. Other unallotted areas are unsuitable for livestock grazing. No grazing would be allowed on the unsuitable unallotted land; but suitable land might be reallotted pending the completion of an environmental analysis report (EAR). No specific objectives are proposed for the unallotted management units. Supervision would be limited to trespass control.

Grazing Administration

Trailing: An average of 65 crossing permits for trailing of livestock on NRL are issued annually in the San Luis Resource Area.

Due to the nature of the crossing routes--county and state roads and small segments of NRL--little forage (less than 30 AUMs in 1976) is consumed. Issuance of crossing permits would be continued.

Trespass: Trespass control as required in the Code of Federal Regulations--43CFR 9230--would be enforced on the 165 management units.

Interrelationships with Other Projects and Management Practices

The Bureau's management of NRL in the San Luis Valley is related to projects or management practices of other federal agencies, state agencies, and to some extent private industries. The following discussion addresses the management proposals of other agencies and the activity related to geothermal energy to show the direct or indirect relationships between the other activities proposed for the valley and the grazing management action proposed by the Bureau. The agencies discussed include the Bureau of Reclamation (BR), U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), U.S. Forest Service (USFS), and Colorado Division of Wildlife (CDW).

Relationship to Bureau Planning System

Management Framework Plans (MFPs) covering the entire San Luis Resource Area have been completed in accordance with the BLM multiple use planning system. The Saguache MFP, which covers the northern half of the valley, was approved by the State Director in 1973. The San Luis MFP, approved in 1975, covers the remainder of the valley. Conflicts between recommendations for domestic livestock grazing and for alternative resource use were examined and resolved in the two MFPs. As a result, management decisions were made concerning grazing. These decisions were made after thorough comparison of the grazing proposals to other resource proposals and after input from the general public, other agencies, and interested groups.

The Saguache and San Luis MFPs established the following grazing management objectives and constraints that were used in the preparation of Allotment Management Plans (AMPs) and other management prescriptions.

(1) Consider chemical or mechanical vegetative manipulation (e.g., chaining) as a last resort; instead, use livestock management to achieve vegetative changes.

(2) Combine allotments to maximum extent feasible in preparation of AMPs.

(3) Implement intensive grazing systems (on several specific allotments) to improve watershed condition by adjusting vegetative species and composition through livestock management.

(4) Impose constraints against certain seasons of use by domestic livestock on specific allotments in consideration of wildlife habitat values (e.g., restriction against fall and winter use by livestock in favor of bighorn sheep on Trickle Mountain).

(5) Maintain unallotted status on specific parcels in consideration of alternative and more efficient uses (e.g., exchange for private lands in order to achieve better-blocked configuration of national resource lands).

(6) Continue custodial grazing management on several specific allotments because no specific problems or opportunities exist that call for more intensive domestic livestock management.

(7) Recognize the importance of domestic livestock grazing on the national resource lands as a significant factor in the economic stability of the San Luis Resource Area. Many grazing allotments provide a strategic or critical use period that highlight their importance in providing operators with a year-round operation, thereby stabilizing agriculture, which is the most important form of income in the valley.

General goals for grazing management that were developed in the MFPs for use in preparation of activity plans (AMPs) are as follows:

(1) Maintain or improve existing wildlife habitat on 516,371 acres of national resource lands.

(2) Increase ground cover, plant composition and density, and reduce

erosion class on 473,916 acres of national resource lands.

(3) Maintain or increase riparian habitat, particularly woody streambank vegetation, on 47 miles of permanent streams on national resource lands.

(4) Maintain or increase production approximately 36,000 AUMs of domestic livestock forage on national resource lands.

Specific objectives that are the basis for developing management prescriptions on each AMP are shown in table I-4 (pp.I-24 f.). In the MFPs domestic livestock grazing was found to be an acceptable use of the national resource lands.

For the most part, the grazing program proposed in this statement follows the recommendations of the MFP. Some deviations from the grazing recommendations, however, do occur in the proposed action as a result of the more intensive field analysis done during the preparation of the AMPs. These changes were made in order to better meet planning recommendations of other resources, particularly wildlife and watershed. For example, the MFP called for grazing on all of the allotments; but now, however, the elimination of grazing has been proposed on nine allotments. Such a change resulted from a closer examination of the allotments with respect to steepness of slope, wildlife needs, and erosion condition of the soil surface. Another example of deviation occurred where two or more allotments were combined into one AMP, in addition to combinations specifically identified in the MFP recommendations. These allotments were combined in order to create better management opportunities, reduce supervision needs, and lower the cost of developing fences, water sources, and other range improvements. Planning decisions as developed in the MFPs are available in the Canon City District Office and the San Luis Resource Area Office in Alamosa.

Bureau of Reclamation

The Closed Basin Project recommended by Bureau of Reclamation would involve pumping an unconfined aquifer covering 105,000 acres located in the east central portion of the San Luis Valley and channeling it into the Rio Grande for use in New Mexico and Texas. Approximately 100,800 acre feet per year would be involved. Additional water from the project would be allocated to the existing Alamosa Waterfowl Refuge and to the development of another refuge near Mishak Lakes near Moffat, Colorado. After meeting these two priorities, the projects would also supply approximately 5,000 acre feet per year of water for irrigation purposes.

This Bureau of Reclamation project could affect isolated tracts of NRL located on the valley floor by possibly converting some surface vegetation through lowering of the water table. There would also be the possibility of acquiring some water (no commitment has been made as to the amount) from these projects for BLM's Blanca Wildlife Management Area. Such water would probably be used to develop wetlands and fisheries to help mitigate the loss of fishing and hunting opportunities from the project. Before the Closed Basin Project plan would be implemented, however, an environmental statement would be prepared. Several years of test pumping would be affected. Some of these test wells would undoubtedly be on NRL, thus making water available for wildlife and domestic livestock use.

U.S. Fish and Wildlife Service

Presently, there are two national wildlife refuges in the San Luis Valley, the Monte Vista Refuge and the Alamosa Refuge. Both refuges allow some cattle grazing, but such use is not related to grazing on NRL. If, through the Closed Basin Project, the Mishak Lakes Refuge would be developed, some NRL in the area would be shifted to USFWS administration. The NRL located in the Mishak Lakes area is presently unallotted, so no livestock grazing would be affected by the transfer of these lands to the USFWS.

National Park Service

The NPS is in the final stages of developing a management plan for the Great Sand Dunes National Monument, located in the San Luis Valley. No grazing is allowed in the monument and none of the proposals in the NPS management plan affect the grazing program on NRL. A recent management framework plan developed by the Bureau states as an objective the need to protect the natural scenery and the visual aesthetic values of the NRL near the sand dunes.

U.S. Forest Service

Two allotments in the San Luis Resource Area, Saguache Park (51E) and Klondyke (159E), are managed cooperatively with the USFS. In the two allotments the operators use both NRL and adjacent national forest lands. The NRL involved are included in one of the pastures of a rest rotation system that mostly includes national forest lands. Annually, the management of these allotments is coordinated through joint meetings with the operators, the USFS, and the BLM.

The USFS and the BLM maintain separate management practices when an operator uses both NRL and national forest lands; yet both agencies closely coordinate their activities in order to work out grazing dates, trailing needs, and cooperative range improvements.

Colorado Division of Wildlife

The Hot Creek Management Area is a cooperative venture between the CDW and the BLM. Livestock grazing privileges have been canceled for the area, and the NRL and the state-owned land are managed exclusively as wildlife habitat. The CDW has also acquired land in the area of La Jara Canyon for wildlife habitat and has recently fenced this land. The land pattern and boundary fencing has made several tracts of NRL in this area inaccessible and therefore unusable for livestock grazing.

The long-range goal of the CDW is to increase and improve wildlife habitat in order to support more numbers of game and nongame wildlife species. Many of the objectives of the proposed action analyzed in this environmental impact statement also involve the improvement of habitat to benefit wildlife species (see table I-4, pp.I-24 f.). Management objectives, as proposed in this statement, are therefore coordinated with those of the CDW.

Energy Leasing Program

A good potential for geothermal energy exists in the San Luis Valley. To date several geothermal leases, involving thousands of acres of both NRL and private surface lands, have been issued. No activity other than leasing has occurred thus far. Since this energy program would not create any large-scale surface disturbances, that is, open pit mining, it is felt that geothermal development would have little effect on the grazing program. Likewise, livestock grazing on NRL as proposed in this statement should have little effect on the development of this potential energy source.

CHAPTER II. DESCRIPTION OF THE ENVIRONMENT

Present Environment

The description of the environment covers the following thirteen categories: climate, air quality, geology and topography, soils, water, vegetation, wildlife, aquatic and riparian communities, land use, archaeological resources, historical resources, aesthetics, and socioeconomic conditions. The degree of detail in the description relates directly to the degree of anticipated impacts.

Climate

Topographical features are the major factors determining the climate within the San Luis Valley. Such features include the Sangre de Cristo Mountains along the eastern edge of the valley; the San Juan Mountains along the western edge; the San Luis Hills located in the southeastern portion of the valley across the Rio Grande; and the Rio Grande itself, which runs through the valley.

Precipitation, temperature, and wind are the three major components used in the following paragraphs to describe climatic conditions for the valley.

Precipitation

Mean monthly precipitation plots, which are based on data gathered at six weather stations in the San Luis Valley, show a unimodal distribution with the peak occurring in mid-summer, that is, July through August (see figure II-1). This peak results primarily from convective-type precipitation events spawned from an inflow of Gulf moisture from the south. In some years a secondary peak occurs in mid-spring (April through May) in response to frontal storms produced from an early influx of Gulf moisture. Winter precipitation is generally low and results from Pacific fronts.

Despite these apparent consistencies in average monthly precipitation, seasonal and annual precipitation vary considerably from year to year. Figure II-2 shows cumulative frequency distributions for annual precipitation in Saguache and Alamosa counties. For both counties there is a greater than 50-percent estimated probability of receiving less than

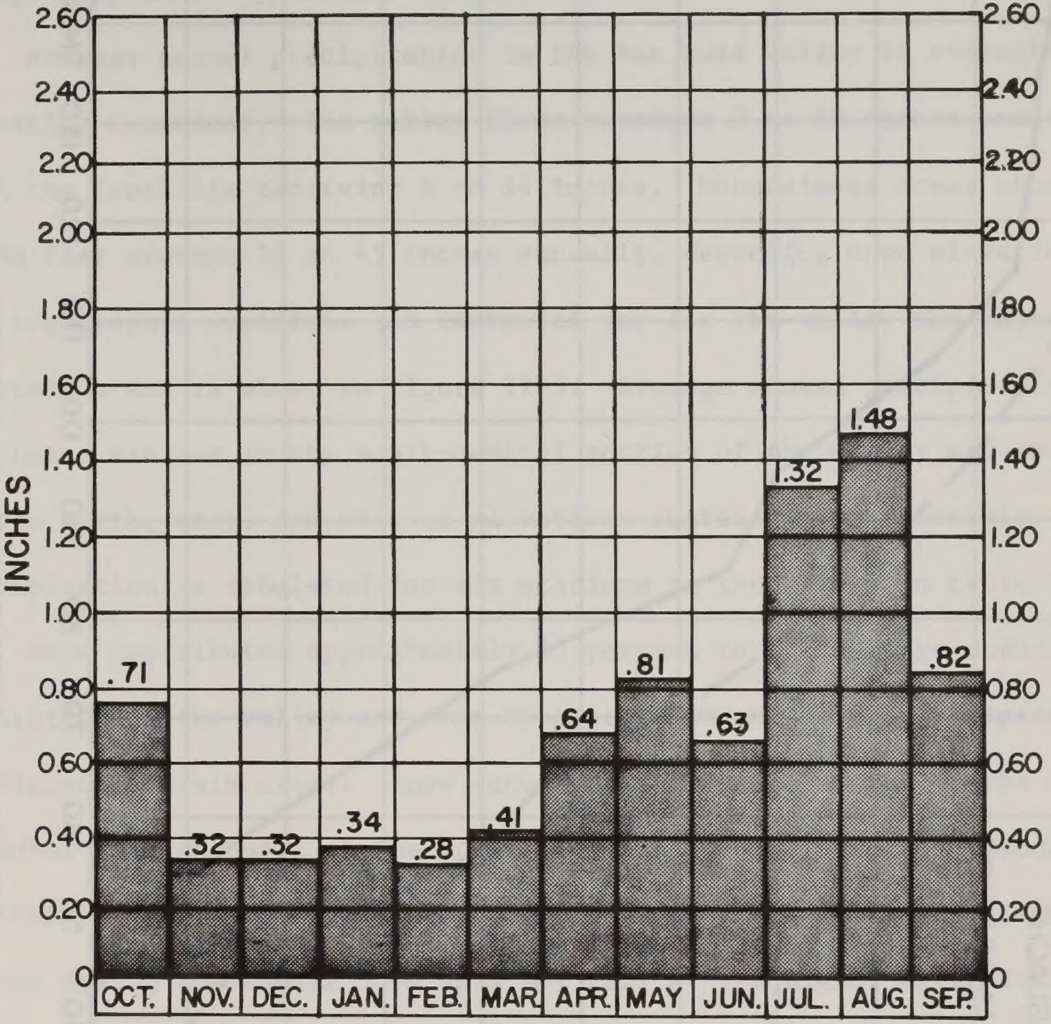


Figure II-1. Mean monthly precipitation

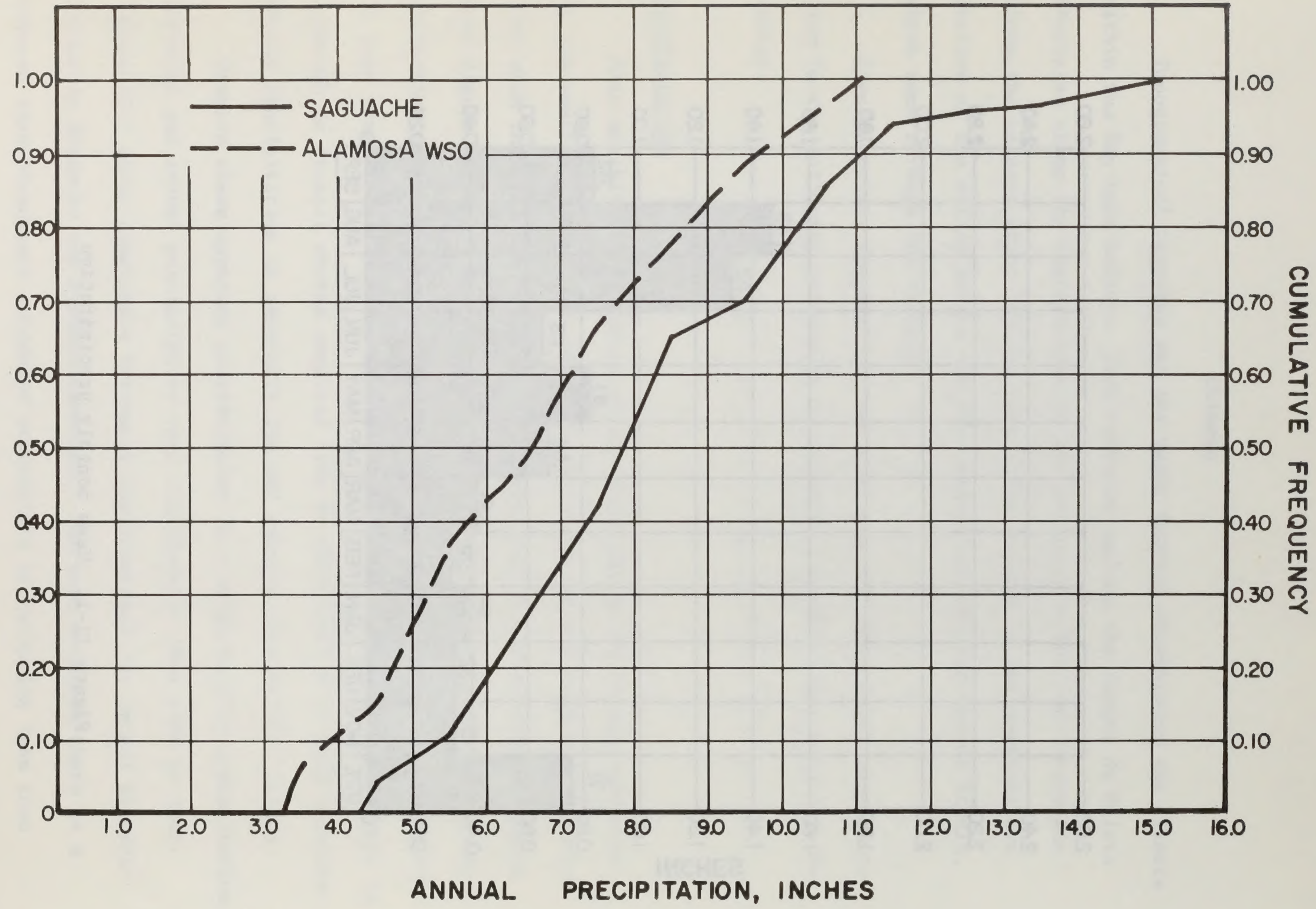


Figure II-2. Cumulative frequency distributions for annual precipitation in Saguache and Alamosa

average annual precipitation in any given year. Analysis of the long-term Saguache precipitation record (1894 to 1975) shows that all months except July have experienced zero precipitation at least once.

Average annual precipitation in the San Luis Valley is strongly elevation-dependent. The valley floor receives 7 to 10 inches yearly, with the foothills receiving 9 to 14 inches. Mountainous areas above 9,000 feet average 14 to 45 inches annually, depending upon elevation and topographic position. An isohyetal map for the valley and adjacent mountain areas is shown in figure II-3. Average annual precipitation reaches a minimum in the south-central portion of the valley and increases to the north, east, and west as elevations increase. Mean monthly precipitation is tabulated for six stations in the valley in table II-1.

Snow contributes approximately 15 percent to the average annual precipitation of the valley and over 80 percent to the annual precipitation of higher mountain areas. Snow occurs primarily during the months of November through April at the lower elevations, with December, January, and February receiving the largest amounts (table II-2). Only a month or two during the summer does snow not fall at the higher elevations. The snowpack is usually gone by the beginning of March on NRL at lower elevations and by the beginning of April at higher elevations.

Both frontal and convective precipitation are produced from the mid-summer Gulf moisture. The convective-type storm events generally have higher rainfall intensities, and therefore greater runoff-producing potential, than do the frontal-type storm events. Variation in rainfall intensity is associated with great variation in raindrop kinetic energy,

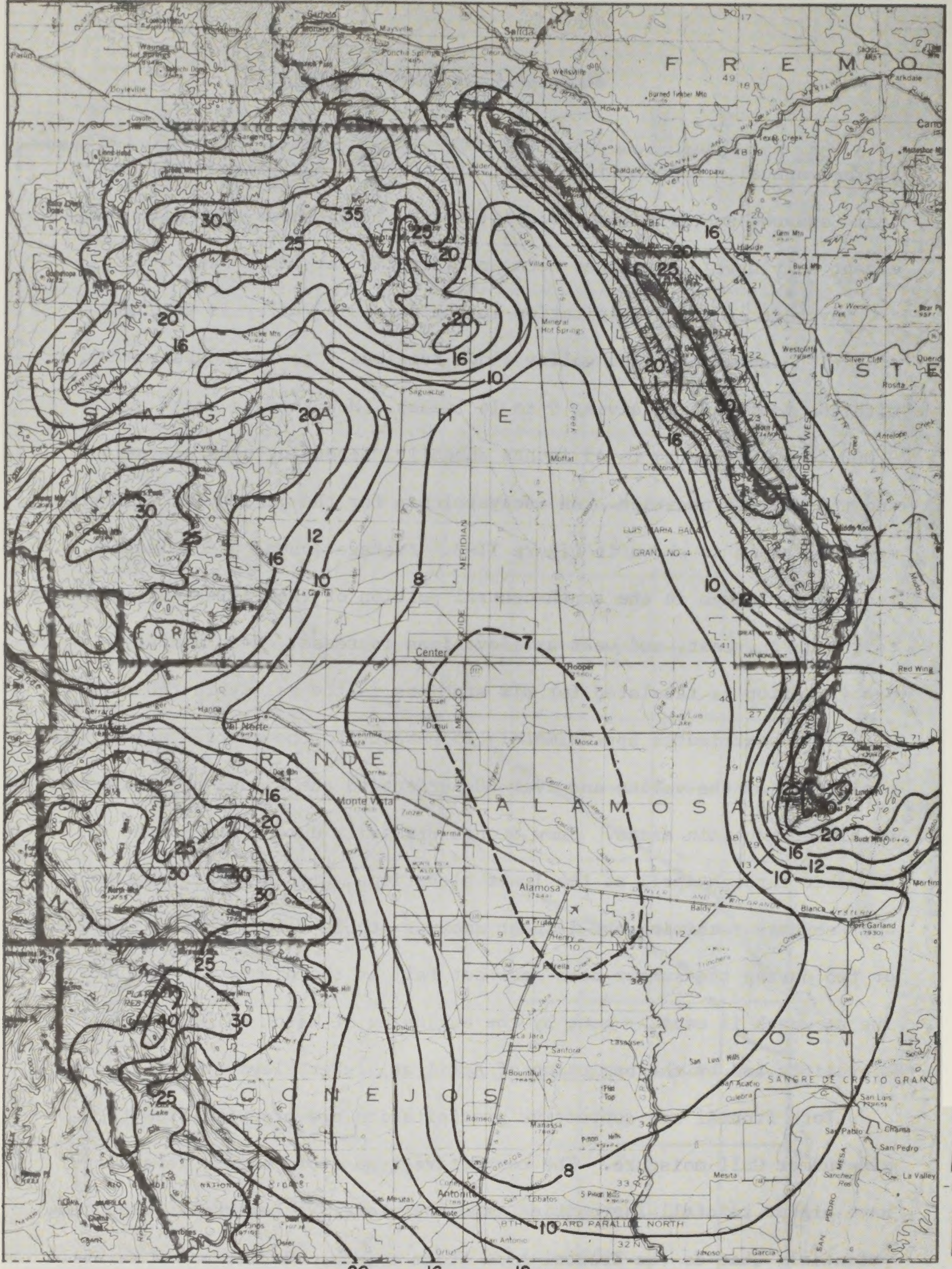


Figure II-3. Average annual precipitation patterns in the valley and surrounding mountains

TABLE II-1. MEAN MONTHLY PRECIPITATION (in inches)

	Alamosa (1948-1975)	Manassa (1931-1975)	Del Norte (1920-1975)	Monte Vista (1939-1975)	Saguache (1895-1975)	Sand Dunes Nat. Mon. (1950-1975)
January	.27	.37	.46	.33	.26	.33
February	.27	.23	.29	.31	.32	.26
March	.35	.31	.50	.41	.40	.48
April	.44	.58	.77	.78	.61	.65
May	.64	.81	.87	.74	.75	1.00
June	.58	.48	.59	.46	.79	.88
July	1.20	.83	1.19	1.13	1.59	1.98
August	1.18	1.26	1.57	1.25	1.59	2.03
September	.75	.74	.88	.64	.84	1.13
October	.71	.63	.82	.60	.76	.78
November	.30	.26	.37	.26	.34	.33
December	.34	.26	.34	.27	.35	.36
Mean annual	7.03	6.76	8.65	8.87	8.60	10.21

TABLE II-2. AVERAGE SNOWFALL

Area	Amount (in inches)
Alamosa	32.2
Del Norte	34.9
Manassa	25.2
Saguache	26.3
Sand Dunes National Monument	33.6

SOURCE: Unit Resource Analysis for Blanca, Conejos, San Luis, and Terrace Planning Units; approved January 6, 1975.

as indicated by table II-3. The estimated design storm depths for the San Luis Valley can be represented by the following precipitation types: "heavy rain," "excessive rain," and "cloudburst."

For any given storm, both total storm depth and storm intensities will vary with elevation. Orographic lift results in greater amounts of precipitation per storm for the mountain slopes than for valley bottoms. The west side of the Sangre de Cristo Mountains during the summer thunderstorm period probably experiences frequent high-intensity lift-convective storm events. These events begin as small convective cells over western and central portions of the San Luis Valley. With west to east airflow, these cells are carried against the west flank of the Sangre de Cristos and lifted to higher elevations. Under this lift-convective regime, the mid-slope region experiences higher intensities and greater storm depths than either the valley bottom or the mountaintops.

The possibility of hail is present every summer. In recent decades hail has become a big concern in the valley since more farmers have been raising tender-leafed vegetables. Even though the occurrence of hail is quite localized, it still damages portions of the valley's crops each year.

Temperature

The average temperature in the San Luis Valley is determined principally by the valley's altitude and location. The valley floor is basically a flat plain surface ranging in elevation from 7,500 to 7,900 feet. This is a major reason for the valley's cool temperatures.

The San Luis Valley has unusually low-level air inversions. An air

TABLE II-3. KINETIC ENERGY AND NUMBER OF DROPS FOR RAINFALL OF VARIOUS INTENSITIES

Precipitation Type	Precipitation Intensity (in./hr.)	Median Diameter (mm.)	Velocity of Fall (ft./sec.)	Drops per Square Foot (no./sec.)	Kinetic Energy (ft.lbs./sq.ft./hr.)
Light rain	0.04	1.24	15.7	26	0.797
Moderate rain	0.15	1.60	18.7	46	4.241
Heavy rain	0.60	2.05	22.0	46	23.47
Excessive rain	1.60	2.40	24.0	76	74.48
Cloudburst	4.00	2.85	25.9	113	216.9

NOTE: The estimated design storm depths for the San Luis Valley can be represented by precipitation types "heavy rain," "excessive rain," and "cloudburst."

SOURCE: Lull, Howard W. 1959. Soil compaction on forest and range lands. U.S. Department of Agriculture, Forest Service, Miscellaneous Publication No. 768.

inversion is a condition in which cold air is trapped near the ground by warmer air above. At Alamosa, air inversions have been measured as low as 50 feet above ground level. Inversions usually occur from 3,000 to 4,000 feet above ground. During inversions at Alamosa, the temperature difference between the cold air below and the warm air above is usually only a few degrees. The air inversion period is greatest during fall and winter months.

Most valleys have a typical "valley flow" of air that moves along the axis of the valley. Warm air moves up the valley during the day, and cool air flows down the valley at night. Valleys also have "slope-flow," during which air flows down the mountain slopes at night and upslope during the day. In the San Luis Valley the valley-flow pattern is very minor because of the broad flat floor. The slope flow of cold air moving down from the surrounding mountains at dusk is slow and accumulates in the Alamosa, Monte Vista, and Blanca area (see figure II-4). The natural outlet for the slow flow of cold air is along the Rio Grande to the south. This outlet is blocked by the San Luis Hills on both sides of the river south of Alamosa. For this reason, there is a concentration of cold air in the winter, especially in the vicinity of Alamosa. This cold air remains until a strong wind moves it out.

Mean annual temperatures are quite low, averaging from 43.6 degrees F in Saguache County to 35.4 degrees F in Mineral County, which is located in the mountainous western fringe of the valley. (Table II-4 gives the mean monthly termperatures and table II-5 lists the mean annual temperatures.) Alamosa holds the record for temperature extremes. It has

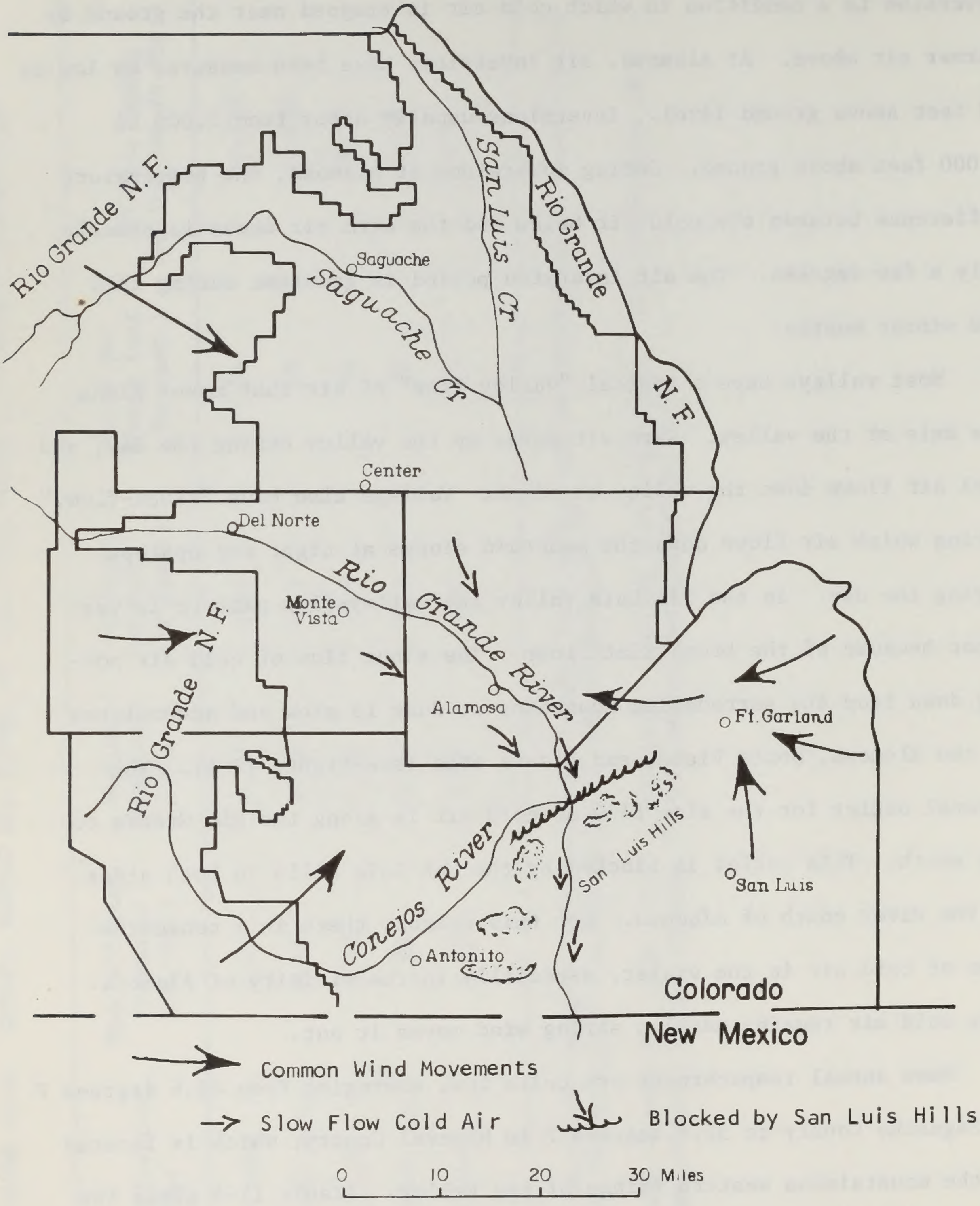


Figure II-4. San Luis Valley air movements

TABLE II-4. MEAN MONTHLY TEMPERATURE
(in degrees F)

	Alamosa	Manassa	Del Norte	Saguache	Sand Dunes Nat. Mon.
January	17.2	18.1	20.2	18.4	22.6
February	23.2	24.9	26.2	29.3	26.1
March	31.2	32.8	33.9	39.1	32.2
April	41.2	42.2	42.5	45.1	41.8
May	50.5	50.8	51.0	50.7	51.8
June	59.8	59.2	58.4	60.2	60.5
July	64.9	63.5	63.1	62.9	65.4
August	62.6	61.9	61.6	61.1	63.2
September	55.1	55.8	55.5	53.8	56.5
October	44.0	45.7	46.1	45.1	46.2
November	29.2	31.2	33.2	22.1	32.8
December	18.6	21.5	23.1	12.7	24.1

TABLE II-5. MEAN ANNUAL TEMPERATURE
(in degrees F)

	Alamosa	Manassa	Del Norte	Saguache	Sand Dunes Nat. Mon.
Mean annual	41.4	42.2	43.9	41.7	43.6
Mean maximum	59.1		52.4	60.2	
Mean minimum	23.7		27.3	27.0	

NOTE: Statistics are derived from data gathered from 1933 to 1973.

SOURCE: Unit Resource Analysis for Blanca, Conejos, San Luis, and Terrace Planning Units; approved January 6, 1975.

received a record high of 93 degrees F and a record low of -50 degrees F. The daily variations are also great, often surpassing a 40-degree range from high to low. The bitter cold that might be expected with such low temperatures is modified to a large extent by the very low humidity, which often gives false impressions of rather warm daytime temperatures.

As might be expected, the combination of high altitude and low temperatures makes the growing season very short (see table II-6).

TABLE II-6. FROST-FREE PERIODS FOR SAN LUIS VALLEY

Area	Average Length (in days)	Average Dates of Latest and Earliest Frost
Alamosa	96	6/8 - 9/12
Del Norte	115	5/31 - 9/24
Manassa	95	6/8 - 9/11
Monte Vista	80	6/8 - 8/26
Poncha Pass	80-90 (estimate)	
Saguache	105	6/3 - 9/16

Wind

The wind is an important climatic factor in the San Luis Valley. It brings in cold air and, as a component of storms, drives the cold air from the valley. The wind is mainly responsible for forming the large dunes in the Great Sand Dunes National Monument on the eastern edge of the valley.

The valley floor, except for the San Luis Hills region to the south, is mainly flat. Because of this flatness, the wind has nothing to obstruct it and slow it down as it leaves the mountains. Because of the excessive amounts of cold air settling into the valley during late winter and early spring, large windstorms occur quite frequently. Wind speeds in excess of 60 knots (69 mph) are not unusual. At times it is impossible to see the sky because of the dust raised by these storms. Cool and windy springs prevent early growth of vegetation. In the northern part of the valley, winds come from the north and west during fall and winter, then from the south during spring and summer. In the southern part, winds usually come from the southwest.

Only recently has the National Weather Service started keeping an hourly report on wind in the valley. Therefore, no data presently exist to determine average monthly wind speeds. The National Weather Service has records showing peak daytime winds for the valley for the first part of 1975: January, 60 knots; February, 57 knots; and April through June, 59 and 51 knots.

Air Quality

In the following paragraphs, air quality is discussed in terms of pollution within the valley. There are three causes of air pollution in the San Luis Valley: (1) inversions, (2) minor valley flow, and (3) the obstruction, created by the San Luis Hills, of the natural outlet for the slow flow of cold air. These three factors characterize the valley as a "closed air basin." The inversions occurring in the valley usually break up one or two hours after sunrise; in winter, however, they occasionally last until 10 a.m. During the inversions, the pollutants accumulate until a strong wind moves them out of the valley.

The Colorado Air Pollution Control Division of the Colorado Department of Health has identified and measured part of these pollutants at different locations within the valley. The pollutants have been identified as particulate matter, hydrocarbons, nitrogen, sulfur, and carbon oxides.

Table II-7 shows average particulate measurements for the city of Alamosa and the Great Sand Dunes National Monument, and table II-8 shows average particulate measurements by three-month intervals for the same locations. Figure II-5 (p.II-20) shows the daily particulate matter time pattern for Alamosa during the winter months 1970-71.

Table II-9 depicts monthly averages of pollution indices in Alamosa for 1970 for particulate matter, benzene solubles (mostly hydrocarbons), and sulfation. As indicated in table II-9, particulate matter is the major source of air pollution within the valley. Table II-10 gives federal and Colorado State standards for these pollutants.

TABLE II-7. AVERAGE PARTICULATE MEASUREMENTS FOR PARTS OF THE SAN LUIS VALLEY (in micrograms/cu. meter)

Year	Alamosa	Great Sand Dunes National Monument
1971	73	22
1972	69	17
1973	78	20
1974	67	13

SOURCE: Unit Resource Analysis for Blanca, Conejos, San Luis, and Terrace Planning Units; approved January 6, 1975.

TABLE II-8. AVERAGE PARTICULATE MEASUREMENTS FOR 1974 (in micrograms/cu. meter)

Quarter	Alamosa	Great Sand Dunes National Monument
Jan.-March	89	13
April-June	86	insufficient data
July-Sept.	64	19
Oct.-Dec.	60	7

NOTE: In 1974, Alamosa had a low of 14 micrograms/cu. meter and a high of 309 micrograms/cu. meter; the national monument had a low of 3 micrograms/cu. meter and a high of 110 micrograms/cu. meter.

SOURCE: Unit Resource Analysis for Blanca, Conejos, San Luis, and Terrace Planning Units; approved January 6, 1975.

TABLE II-9. MONTHLY AVERAGES OF POLLUTION INDICES
IN ALAMOSA FOR 1970

Month	Particulate Matter $\mu g/M^3$	Benzene Solubles $\mu g/M^3$	Sulfation $SO_3 Mg/100cm^3/day$
Jan.	72	6.5	0.01
Feb.	71	6.4	0.03
Mar.	73	2.6	0.02
Apr.	70	3.3	0.03
May	78	3.1	0.03
June	69	2.7	0.00
July	60	2.5	0.07
Aug.	55	2.6	0.04
Sept.	59	3.7	0.02
Oct.	78	3.1	--
Nov.	121	3.7	0.02
Dec.*	82	4.7	0.03

* Storm fronts established strong winds for greater than one-half this month.

SOURCE: Unit Resource Analysis for Blanca, Conejos, San Luis, and Terrace Planning Units; approved January 6, 1975.

TABLE II-10. AIR POLLUTANTS: FEDERAL AND COLORADO STATE STANDARDS

	1972 Sources	
Pollutant Type	Federal (max.)	Colorado State (max.)*
Particulate matter a/	75 $\mu g/m^3$**	55 $\mu g/m^3$
Hydrocarbons b/	160 $\mu g/m^3$ = .08 ppm	2 ppm
Carbon Monoxide c/	10 $\mu g/m^3$	2 ppm
Sulfur Oxides d/	80 $\mu g/m^3$ = .04 ppm	Not Available
Nitrogen Oxides e/	100 $\mu g/m^3$	Not Available
Total Oxidants f/	160 $\mu g/m^3$ = .08 ppm	.05 ppm: 1-hour average .01 ppm: annual average

* State standards as specific for Denver
** $\mu g/m^3$ = micrograms per cubic meter

a/ Annual average of 24-hour samples
b/ 3-hour average for federal; annual average for state
c/ 8-hour average for federal; annual average for state
d/ Annual average for federal
e/ Annual average for federal
f/ 1-hour average for federal; 1-hour and annual averages for state

According to Mueller (1971), the predominant pollution

> . . . episode is at night due to the very common occurrence of inversions over the city. These are at a very low altitude, less than 100 ft. for those which have been measured. Particulate matter values are obtained from 24 hour averages. Since /most/ pollution occurs mainly at night, the values during the episode would be approximately 1½ the average shown /in table II-8, p.II-17/.
>
> The data can be explained under the following assumptions, although what follows does not constitute a proof.
>
> (1) The major source of pollution in Alamosa, at present, is home heating.
> (2) Inversion or stagnant air conditions occur almost nightly during the winter.
> (3) There is a small ventilation factor (horizontal), which is not capable of clearing the air under the maximum pollution rate.
> (4) There are two temperature drops of large proportions; one at sunset and one at sunrise.
>
> At sunset the temperature drops suddenly; all home furnaces come on to keep up with this, as well as the added load of cooled air introduced into the homes due to the many entrances and exits from many homes at this time. Also occurring is the onset of the inversion to trap this increased output of pollution. The horizontal ventilation cannot keep up and there is an increase in pollution concentration /see figure II-5/. After 8:00 p.m. the furnaces catch up and activity slows down, resulting in a decreased pollution output rate. The ventilation then starts to reduce the level of pollution under the inversion, but it decreases towards morning as the wind speed decreases. This results in a slight pollution buildup during the night after an initial drop. With sunrise there is another drop in temperature and an increase in activity resulting in another peak of pollution output. With sunrise there also occurs the breaking of the inversion and both horizontal and vertical ventilation increases significantly, clearing the air . . .
>
> The small peak at midnight is not accounted for by this explanation. What would be needed to explain it would be some localized source with an output just after midnight (p. 180).

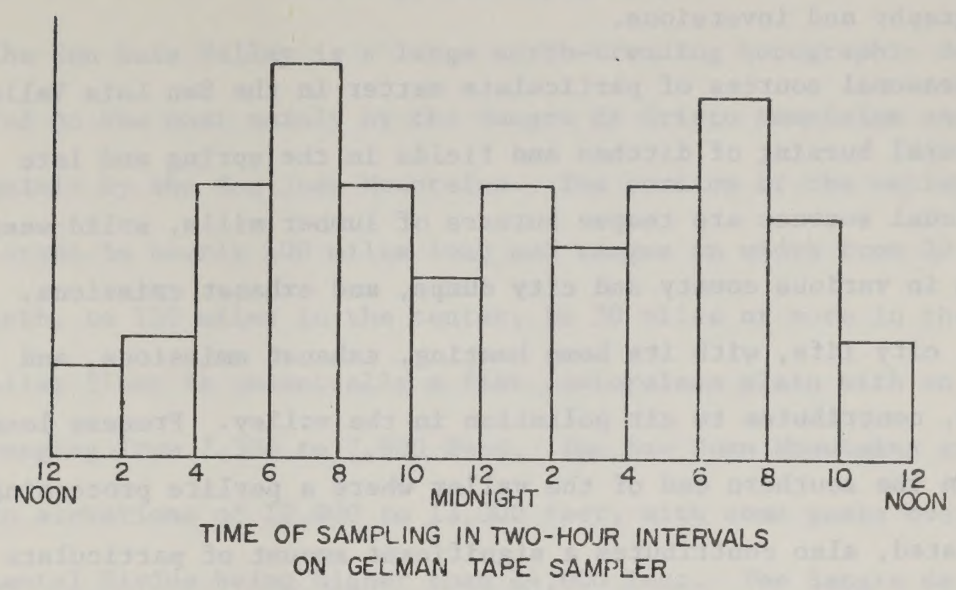


Figure II-5. Pattern of relative concentration of particulate matter during winter months for Alamosa

The predominant pollution measurements indicate particulate matter as being the major contributor to the pollution problem in the valley. The city of Alamosa has average quantities of particulate matter that often exceed state standards and occasionally exceed federal standards (see tables II-9, p.II-18, and II-10, p.II-19).

Overall air quality in the valley is not as low as in certain parts of Denver, but particulate pollution, based on an annual average, consistently exceeds state standards and, on occasion, federal standards. The agent chiefly responsible for lowering air quality within the valley is particulate matter, most of which is produced by human activity. The potential for increased air pollution in the valley is largely due to valley topography and inversions.

Major seasonal sources of particulate matter in the San Luis Valley are agricultural burning of ditches and fields in the spring and late fall. Continual sources are teepee burners of lumber mills, solid-waste incineration in various county and city dumps, and exhaust emissions. In addition, city life, with its home heating, exhaust emissions, and power plants, contributes to air pollution in the valley. Process loss, especially in the southern end of the valley where a perlite processing plant is located, also contributes a significant amount of particulate matter.

Severe wind storms in late winter and spring add significant amounts of particulate pollution to the atmosphere in the form of dust. During daylight hours, when winds are generally at their highest, measurements indicate that particulate pollution levels are at their lowest, even during the late winter and spring months. Since high particulate values do not occur during the day, particulate pollution must originate from sources other than dust.

Geology and Topography

The San Luis Valley is a large north-trending topographic depression bordered on the east mainly by the Sangre de Cristo Mountains and on the west mainly by the San Juan Mountains. The portion of the valley that lies in Colorado is nearly 100 miles long and ranges in width from 20 miles in the north, to 150 miles in the center, to 50 miles or more in the south. The valley floor is essentially a flat featureless plain with an elevation ranging from 7,500 to 7,900 feet. The San Juan Mountains gradually rise to elevations of 12,000 to 13,000 feet, with some peaks over the Continental Divide being higher than 14,000 feet. The Sangre de Cristo Mountains rise abruptly from the valley floor and reach elevations over 14,000 feet. Steep alluvial fans extend from the rugged eastern range down to the valley floor. The San Luis Hills, a series of hills and mesas that rise 500 to 1,000 feet above the valley floor, lie in the southern portion of the valley near the community of San Luis. Active sand dunes, located in the Great Sand Dunes National Monument, contain a relief of approximately 800 feet.

The national resource lands (NRL) that would be affected by the action proposed in this statement lie near the outer edges of the valley adjacent to mountain fronts. As a result, most of the land is steep and mountainous with rock outcroppings and steep canyons or gradually sloping alluvial fans dissected by small drainages.

These topographical features have been shaped through aeons by changing geologic and climatic processes. The mountainous and rocky areas were formed by volcanic activity, which folded and uplifted the earth's crust, and by the processes of weathering and erosion. Gradually, sloping alluvial fans were formed by intermittent streams carrying vast quantities of weathered rock debris from adjacent mountain fronts to the valley below. These natural processes are still active today, although their results would not be seen within one person's lifetime, nor even for several centuries.

Human presence in the valley has had no noticeable effect upon regional topography. Perhaps local features have been altered or obscured by human activity, but the scale of activities, such as livestock grazing, agriculture, and mining, has been minute and the effects of activities short-lived compared to the age-old geologic and climatic processes that form topography.

Soils

Soil is a natural body at the surface of the earth with properties resulting from environmental forces which have acted on parent materials over the ages. Because it is a dynamic body, the character of the soil differs from place to place in the landscape, depending on the nature and intensity of the factors controlling soil formation.

Five factors influence the formation of soil in its virgin state at any specific location: climate, living organisms, time, relief, and parent materials. All of these factors are highly complex. The climate is varied and there are many kinds of living organisms. Parent materials differ widely in physical, chemical, and mineralogical properties. In addition, the length of time that these factors have been active varies greatly.

Soil Associations in the Resource Area

Soil associations normally consist of one or more major soils and some minor soils, occurring in a distinctive proportional pattern. Soils can occur in one or more soil associations. Soil associations have been used in this report as a way of identifying soils in the San Luis Resource Area. Table II-11 lists the soil associations and the percentage of each major soil included in each association. Figure II-6 (p.II-28,29) shows the location of 34 different soil associations in the resource area.

TABLE II-11. SOIL ASSOCIATIONS AND POTENTIAL PRODUCTIVITY IN THE SAN LUIS RESOURCE AREA

Map References a/	Soil Association b/	Acres c/	Potential Productivity (lbs. vegetal production/acre) d/	Potential Productivity (in thousands of pounds) e/	Potential Productivity (AUMs) f/
1	Hooper (50%)-Corlett (20%)	13,621	650	8,854	4,919
2	Costilla (40%)-Space City (40%)	7,073	900	6,366	3,537
3	Uracca (40%)-Mount Home (40%)-Comodore (20%)	9,037	750	6,778	3,766
4	Cotopaxi (75%)-Dune Land (25%)	1,070	900	9,630	5,350
5	*Hooper (50%)-Corlett (20%)-Arena (30%)	--	--	--	--
6	Graypoint (65%)-San Arcacio (20%)-Platoro (15%)	5,017	628	3,151	1,751
7	Garita (50%)-Traveler (40%)-Luhon (10%)	97,599	550	53,680	29,822
8	Ryan Park (50%)-Space City (30%)	9,412	730	6,871	3,817
9	Cumbres (30%)-Empedrado (30%)-Curecenti (20%)	23,672	1,030	24,382	13,546
10	Bushvalley (40%)-Youga (20%)-Jerry (15%)	25,226	2,400	60,542	33,634
11	Seitz (60%)-Bushvalley (20%)	575	640	368	204
12	Luhon (35%)-Garita (30%)-Traveler (22%)	34,147	530	18,098	10,054
13	Celeste (40%)-Tolman (25%)-Empedrado (20%)	12,314	795	9,790	5,439
14	Seitz (45%)-Embargo (25%)-Fulcher (20%)	6,576	1,215	7,990	4,439
15	Cryoborolls (40%)-Argiborolls (35%)	55,503	1,000-1,500**	63,034	35,019
16	Haploborolls (60%)-Argiborolls (30%)	13,774	750	10,331	5,739
17	Stunner (40%)-Luhon (25%)-Monte (20%)	38,922	560	21,796	12,109
18	Nortonville (40%)-Alamosa (30%)-La Sauses (30%)	1,393	1,670	2,326	1,292
19	Comodore (35%)-Celeste (35%)-Rock Outcrop (30%)	32,514	421-750**	19,764	10,980
20	Garita (60%)-Luhon (30%)	8,962	560	5,019	2,788
21	Costilla (45%)-Space City (15%)	9,354	720	6,735	3,742
22	Haplargids (45%)-Calciorthods (30%)-Torriorthents (25%)	958	900	862	479
23	San Arcacio (35%)-Acacio (20%)-Zinger (25%)	1,264	820	1,036	576
24	Traveler (45%)-Rock Outcrop (15%)-Luhon (15%)	5,623	440	2,474	1,374
25	Cryoboralf (65%)-Rock Outcrop (20%)	9,920	200	1,984	1,102
26	Cryoborolls (60%)-Cryoboralfs (30%)	320	200	64	36
27	*Cryaquolls	--	--	--	--
28	Cryoborolls	3,273	1,500	4,910	2,728
29	Rock Outcrop	3,098	200	620	344
30	Uracca (45%)-Empedrado (30%)-Tolman (25%)	18,933	805	15,241	8,467
31	*Alamosa (40%)-Vastine (30%)-Fluvaquent (20%)	--	--	--	--
32	*Hooper (50%)-Corlett (30%)	--	--	--	--
33	Dunnul (65%)-Graypoint (20%)-Derrick (15%)	5,230	478	2,500	1,389
34	*Cotopaxi (85%)-Dune Land (15%)	--	--	--	--
	TOTAL	454,380 c/		375,196	208,442

a/ The map reference numbers refer to Figure II-6 (p.II-28,29).

b/ Minor soils that sometimes comprise a part of a soil association are not listed in this table. Therefore, the composition does not necessarily total 100% for each soil association. The soil names and interpretations are tentative and subject to change.

c/ Acres of NRL which are suitable for livestock grazing in each association; 19,536 acres are unsuitable.

d/ Pounds of vegetal production per acre was determined using SCS production data for the various soils found in the soil associations. Data are for an average climatic year and climax vegetation site.

e/ Potential Productivity = Acres (c) X Potential Productivity/Acres (d), expressed in thousands of pounds. Thus 8,854 = 8,854,000 pounds.

f/ Not all vegetal production is usable forage. The fraction of usable forage per unit of vegetal production varies widely, depending on plant species present. An AUM is 750 pounds of usable forage. A reasonable conversion factor was estimated to be 1800 pounds of vegetal production per AUM.

* No AMPs in these associations.

** Production variations in these associations are due to slight soil differences within the association.

SOURCES: (1) "Soil Survey of Alamosa, Colorado," issued in 1973 by the Soil Conservation Service and the Colorado Agricultural Experiment Station. (2) Preliminary reports from Conejos and Rio Grande counties. (3) General Soils Map--Saguache County--June, 1972.

Soil Descriptions: Alamosa, Rio Grande, Conejos, and Saguache* Counties

Table II-12 summarizes the more important physical and chemical characteristics of individual soils that occur in the soil associations found in Alamosa, Rio Grande, and Conejos counties. A more detailed description of the soils can be found in Appendix 1.

The physical characteristics of soils are commonly defined and described in terms of their drainage class, waterholding capacity, permeability, surface runoff, and erosion susceptibility. Drainage class refers to the rate at which water is removed from a soil. Classes are defined as follows.

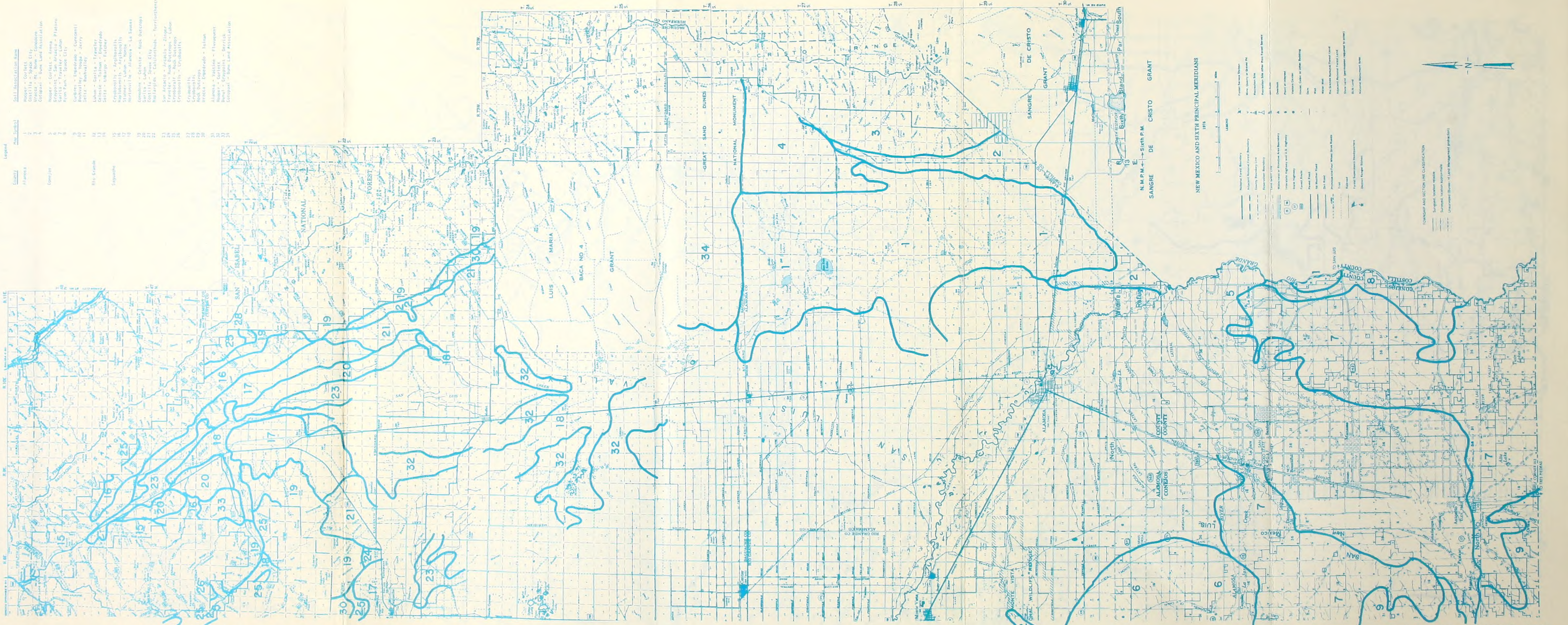
1. Poorly drained: water is removed so slowly that the soil remains wet for a large part of the time. Water table is commonly at or near the surface.
2. Moderately well drained: water is removed from the soil somewhat slowly so that the soil is wet for a small but significant part of the time.
3. Well drained: water is removed from the soil readily, but not rapidly. Well-drained soils have no standing water table.

Waterholding capacity is the ability of a soil to store water for plant growth. It indicates the amount of water that the soil will hold between full capacity and wilting points. The classes are as follows.

1. High: 9 to 12 inches of water would be available for plant growth.

---

* Detailed soil surveys have not been completed in Saguache County. A general soil association map (prepared in 1972 by the SCS) was used to describe soil characteristics for those portions of the county that do not have detailed soil surveys. These associations--Cryaquolls, Cryoboralf-Rock Outcrop, Cryoborolls, Cryoborolls-Argiborolls, Haplargids-Calciorthods-Torriorthents, and Haploborolls-Argiborolls are described in detail in Appendix 1-B.


SANGRE DE CRISTO RANGE
GREAT SAND DUNES NATIONAL MONUMENT
LUIS MARIA BACA NO. 4 GRANT
SAN ISABEL NATIONAL FOREST
SANGRE DE CRISTO GRANT
ALAMOSA
ALAMOSA COUNTY
CONEJOS COUNTY
MONTE VISTA NATL. WILDLIFE REFUGE
Wildlife Refuge
RIO GRANDE
NEW MEXICO AND SIXTH PRINCIPAL MERIDIANS
N.M.P.M. ← → Sixth P.M.
N

Legend

County	Map Symbol	Soil Association Name
Alamosa	1	Hooper - Corlett
	2	Costilla - Space City
	3	Uracca - Mt. Home - Comodore
	4	Cotopaxi - Dune Land Association
Conejos	5	Hooper - Corlett - Arena
	6	Graypoint - San Arcacio - Platoro
	7	Garita - Traveler - Luhon
	8	Ryan Park - Space City
	9	Cumbres - Empedrado - Curecanti
	10	Bushvalley - Youga - Jerry
	11	Seitz - Bushvalley
Rio Grande	12	Luhon - Garita - Traveler
	13	Celeste - Tolman - Empedrado
	14	Seitz - Embargo - Fulcher
Saguache	15	Cryoborolls - Argiborolls
	16	Haploborolls - Argiborolls
	17	Stunner - Luhon - Monte
	18	Hortonville - Alamosa - La Sauses
	19	Comodore - Celeste - Rock Outcrops
	20	Garita - Luhon
	21	Costilla - Space City
	22	Haplargids - Calciorthids - Torriorthents
	23	San Arcacio - Arcacio - Zinger
	24	Traveler - Rock Outcrops - Luhon
	25	Cryoboralf - Rock Outcrops
	26	Cryoborolls - Cryoboralfs
	27	Cryaquolls
	28	Cryoborolls
	29	Rock Outcrops
	30	Uracca - Empedrado - Tolman
	31	Alamosa - Vastine - Fluvaquents
	32	Hooper - Corlett
	33	Dunul - Graypoint - Derrick
	34	Cotopaxi - Dune Land Association

FIGURE II-6A. LOCATION OF SOIL ASSOCIATIONS IN THE SAN LUIS RESOURCE AREA

Legend

County	Map Symbol	Soil Association Name
Alamosa	1	Hooper - Corlett
	2	Costilla - Space City
	3	Uracca - Mt. Home - Comodore
	4	Cotopaxi - Dune Land Association
Conejos	5	Hooper - Corlett - Arena
	6	Graypoint - San Arcacio - Platoro
	7	Garita - Traveler - Luhon
	8	Ryan Park - Space City
	9	Cumbres - Empedrado - Curecenti
	10	Bushvalley - Youga - Jerry
	11	Seitz - Bushvalley
Rio Grande	12	Luhon - Garita - Traveler
	13	Celeste - Tolman - Empedrado
	14	Seitz - Embargo - Fulcher
Saguache	15	Cryoborolls - Argiborolls
	16	Haploborolls - Argiborolls
	17	Stunner - Luhon - Monte
	18	Nortonville - Alamosa - La Sauses
	19	Comodore - Celeste - Rock Outcrops
	20	Garita - Luhon
	21	Costilla - Space City
	22	Haplargids - Calciorthods - Torriorthents
	23	San Arcacio - Arcacio - Zinger
	24	Traveler - Rock Outcrops - Luhon
	25	Cryoboralf - Rock Outcrops
	26	Cryoborolls - Cryoboalfs
	27	Cryaquolls
	28	Cryoborolls
	29	Rock Outcrops
	30	Uracca - Empedrado - Tolman
	31	Alamosa - Vastine - Fluvaquent
	32	Hooper - Corlett
	33	Dunul - Graypoint - Derrick
	34	Cotopaxi - Dune Land Association

FIGURE II-6B

LOCATION OF SOIL ASSOCIATIONS IN THE SAN LUIS RESOURCE AREA

TABLE II-12. SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS

Soils	Position on Landscape and Slope Ranges	Parent Materials	Drainage Class	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Water-holding Capacity	Permeability	Surface Runoff	Erosion Susceptibility
Acacio	alluvial flood plains 0-3%	medium-textured calcareous alluvium	well-drained	sandy loam to clay loam	60+	strongly alkaline	60	moderate to high	moderate to moderately slow	slow to moderate	slight to moderate
Alamosa	flood plains 0-1%	loamy alluvium	poorly drained	loam to sandy clay loam	60+	neutral to moderately alkaline	40-60	high	moderately slow	moderate	moderate
Arena	alluvial flood plains 0-1%	mixed alluvium	poorly drained	loam to sandy clay loam	60+	strongly to very strongly alkaline	15-40	high	slow	slow	moderate
Bushvalley	mountain parks 10-40%	colluvium from volcanic rock	well-drained	cobbly loam to cobbly clay loam	10-20	variable	10-20	low	moderately slow	moderate to rapid	severe
Celeste	mountain slopes 5-25%	residuum of rhyolite, andesite, or latite	well-drained	very stony loam to loam	10-20	mildly alkaline	10-20	low	moderate	moderate	moderate
Corlett	low dunes undulating & dunelike	reworked sands	moderate to well-drained	sand	60+	very strongly alkaline	60	low	rapid	slow	severe wind
Costilla	alluvial flood plains 0-2%	coarse-textured alluvium	well-drained	gravelly loamy sand to gravelly sand	60+	mildly to strongly alkaline	60	low	rapid	slow	severe wind
Comodore	mountain slopes 40-150%	colluvium from igneous & metamorphic rock	well-drained	stony loam	10-20	slightly acid	10-20	low	moderate	rapid	severe
Cotopaxi	valley floor 10-25%	reworked sands	well-drained	sand	60+	mildly alkaline	60	low	rapid	slow	severe wind
Curecenti	alluvial fans and high terraces 5-25%	mixed alluvium	well-drained	cobbly loam to cobbly loamy sand	60+	neutral	10-20	low	moderate	moderate	moderate

TABLE II-12. SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (cont.)

Soils	Position on Landscape and Slope Ranges	Parent Materials	Drainage Class	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Water-holding Capacity	Permeability	Surface Runoff	Erosion Susceptibility
Cumbres	sloping hills, ridges, and mountainsides 1-9%	residuum of igneous rocks	well-drained	stony loam to stony clay loam	36	neutral to slightly alkaline	22	moderate	moderately slow	moderate to rapid	slight to moderate
Derrick	along edge of valley floor on alluvial fans, terraces 0-3%	mixed alluvium	well-drained	cobbly sandy loam to cobbly loamy sands	20 in. over sand, gravel, cobble	neutral to slightly alkaline	17	low	moderately rapid	slow	slight to moderate
Dune Land	valley floor undulating	reworked sand	well-drained	sand	60+	variable	--	low	rapid	slow	severe wind
Dunnul	alluvial fans, terraces 0-1%	coarse-textured alluvium	well-drained	gravelly sand, loam	8-10 in. over sand, gravel, cobble	moderately alkaline	10	low	rapid	slow	slight
Embargo	mountain slopes 10-25%	clayey residuum from rhyolite	well-drained	stony loam to clay	20-40	neutral to mildly alkaline	20-40	low to moderate	slow	moderate	slight
Empedrado	upland hills, alluvial fans 3-25%	mixed alluvium	well-drained	loam to sandy clay loam	40-60	neutral to mildly alkaline	20-40	high	moderate to moderately slow	moderate	moderate
Fluvaquent	alluvial bottoms 0-3%	loamy alluvium	poorly drained	loam to clay loam over sands	24	variable	--	moderate to high	moderate to slow	slow	slight
Fulcher	alluvial fans, mountain slopes 0-3%	clayey alluvium	well-drained	cobbly loam to cobbly clay loam	60+	moderately alkaline	60	high	moderate to slow	moderate	moderate
Garita	alluvial fans, terraces 1-25%	coarse-textured alluvium of basalt	well-drained	cobbly loam to gravelly sand loam	60+	moderately alkaline	5-40	moderate	moderate	moderate	moderate
Graypoint	broad alluvial fans, terraces 0-2%	alluvial sediments, principally from basalt	well-drained	gravelly sand loam over sand and gravel	15-25	neutral to moderately alkaline	10-20	low	moderate to rapid	slow	slight

TABLE II-12. SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (cont.)

Soils	Position on Landscape-and Slope Ranges	Parent Materials	Drainage Class	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Water-holding Capacity	Perme-ability	Surface Runoff	Erosion Suscepti-bility
Hooper	flood plains of valley floor 0-1%	fine tex-tured valley fill	well-drained	loamy sand to clay loam over loose sand	60	strongly alkaline	60	low	slow	slow	slight to moderate
Jerry	mountain slopes and valley fill side slopes 3-25%	moderately fine gravelly alluvium	moderate-ly well to well-drained	loam to gravelly stony clay loam	60	neutral	40+	moderate	slow	rapid	moder-ately high
La Sauses	alluvial flood plains 0-1%	fine-textured alluvium	poorly drained	sandy clay loam to clay loam--sandy clay loam over sand and gravel	52+	neutral to moderately alkaline	30	moderately low	slow	slow	slight
Luhon	alluvial fans, terraces 1-3%	mixed alluvium	well-drained	loam to gravelly loam	60	moderately to strongly alkaline	60	moderately high	moderate	moderate	moderate
Monte	alluvial fans and flood plains 0-3%	mixed alluvial sediment, mainly from igneous rocks	well-drained	loam to fine sandy loam	60	neutral to moderately alkaline	60	high	moderate	moderate	moderate
Mount Home	alluvial fans 4-12%	coarse-textured alluvium	well-drained	very cobbly sandy loam	20	mildly alkaline	20	low	moderately rapid	slow	slight
Nortonville	low flood plains of valley floor 0-10%	moderately fine-textured alluvium	well to poorly drained	loam to clay loam	60	strongly alkaline	20	high	moderately slow	slow	slight
Platoro	alluvial fans, terraces 1-3%	coarse-textured alluvium	well-drained	loam to very gravelly loamy sand over gravel and cobble	20-40	moderately to strongly alkaline	15	moderate	moderate	slow	moderate
Rock Outcrops	90% exposed bedrock with shallow to very shallow soils with physical characteristics submerged by the rock outcroppings										

TABLE II-12. SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (cont.)

Soils	Position on Landscape and Slope Ranges	Parent Materials	Drainage Class	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Water-holding Capacity	Permeability	Surface Runoff	Erosion Susceptibility
Ryan Park	sloping fans 3-5%	mixed alluvium	well-drained	sandy loam to loamy sands	60+	neutral	60+	moderately low	moderately rapid to rapid	slow	moderate
Seitz	sloping to steep mountainsides and ridges 20-65%	outwash material	well-drained	very stony loam to very stony clay loam	60+	neutral	40+	moderate	slow	slow	moderate to rapid
San Arcacio	flood plains 0-1%	mixed alluvium	moderately well-drained	sandy loam to sandy clay loam over sand and gravel	20-36	moderately to strongly alkaline	20+	low	moderate	slow	slight to moderate
Space City	low ridges of the valley floor 0-3%	coarse-textured alluvium	well-drained	loamy fine sand	60	moderately alkaline	60	low	rapid	slow	severe wind
Stunner	sloping fans 1-3%	alluvium mainly from basaltic rocks	well-drained	loam to clay loam	60+	neutral to moderately alkaline	60	high	moderate	moderate	moderate
Tolman	foothill slopes 3-25%	loamy residuum	well-drained	very stony loam to very cobbly clay loam over bedrock	10-20	neutral	10-20	low	moderate	moderate to rapid	moderate
Traveler	sloping ridges and mesa tops 3-25%	weathered basaltic rock	well-drained	very gravelly loam	10-20	moderately alkaline	20	low	moderate	moderate	moderate
Uracca	steep alluvial fans 15-35%	very coarse alluvium	well-drained	very cobbly loam to very cobbly clay loam	53-60	moderately alkaline	23-60	low	moderate to rapid	slow	slight
Vastine	bottoms along major creeks 0-1%	moderately fine alluvium	poorly drained	loam to sandy clay loam over sand or loamy sands	60	moderately alkaline	60	moderate	moderate to moderately slow	slow	slight

TABLE II-12. SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (cont.)

Soils	Position on Landscape and Slope Ranges	Parent Materials	Drainage Class	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Water-holding Capacity	Perme-ability	Surface Runoff	Erosion Suscepti-bility
Youga	fans, terraces 3-25%	glacial fill or alluvial outwash	well-drained	loam to clay loam	40-50	neutral	40-50	moderately high	moderate to slow	moderate to rapid	moderate
Zinger	fans, terraces 0-3%	mixed alluvium	well-drained	loam to sandy loam	60	moderately alkaline	60	high	moderate	slow	slight

2. Moderately high: 6 to 9 inches of water would be available for plant growth.

3. Low to moderately low: 3 to 6 inches of water would be available to plant growth.

Permeability is that quality of the soil which enables it to transmit water or air. Soil permeability can be quantified in terms of a rate of flow of water through a cross section of saturated soil in a given time. Permeability rates are expressed in inches per hour. The classes are as follows.

1. Slow: .06 to .20 inch per hour
2. Moderately slow: .20 to .60 inch per hour
3. Moderate: .60 to 2.00 inches per hour
4. Moderately rapid: 2.00 to 6.00 inches per hour
5. Rapid: 6.00 to 20.00 inches per hour

Surface runoff refers to the relative rate water flows over the surface of the soil. The classes are defined as follows.

1. Slow: surface water flows away so very slowly that free water covers the soil for a significant period or enters the soil rapidly.

2. Moderate: surface water flows away at such a rate that a moderate portion of the water enters the soil and free water lies on the surface for only a short period of time.

3. Rapid: a large portion of the precipitation moves rapidly over the surface of the soil and a small part moves through the soil.

Erosion susceptibility is a rating based on expected losses of surface soil when all vegetative cover including litter is removed. The classes are as follows.

1. Slight: little loss of soil material is expected. Minor sheet or rill erosion may occur.

2. Moderate: some loss of surface soil material can be expected. Rills, small gullies, and sheet erosion may occur.
3. Severe: considerable loss of surface soil material can be expected. Rills, numerous small gullies, and sheet erosion can occur.

Soil Hydrologic Groupings

In table II-13 soil associations have been placed into four hydrologic groups that indicate the general infiltration and water movement ability of the soils and the bedrock. The four groups are defined as follows:

Group A: Soils having high infiltration rates even when thoroughly wetted, consisting chiefly of deep, well- to excessively drained sands and/or gravel. These soils have a high rate of water transmission and would result in a low runoff potential.

Group B: Soils having moderate infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well- to well-drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C: Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of (1) soils with a layer that impedes the downward movement of water or (2) soils with a moderately fine to fine texture and a slow infiltration rate. These soils have a slow rate of water transmission.

Group D: Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of (1) clay soils with high swelling potential, (2) soils with a high permanent water table, (3) soils with claypan or clay layer at or near the surface, and (4) shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission.

Plus (+) or minus (-) are used to further refine these four hydrologic groups. For example, A+ has slightly better infiltration rates than A; B- has slightly less infiltration rates than B.

TABLE II-13 SOIL HYDROLOGIC GROUPING BY SOIL ASSOCIATION

Map References 1/	Soil Association	Soil Hydrologic Group
1	Hooper (50%)-Corlett (20%)	$C^+ - B^-$
2	Costilla (40%)-Space City (40%)	A
3	Uracca (40%)-Mount Home (40%)-Comodore (20%)	A^-
4	Cotopaxi (75%)-Dune Land (25%)	A^+
5	Hooper (50%)-Corlett (20%)-Arena (30%)	$C^+ - B^-$
6	Graypoint (65%)-San Arcacio (20%)-Platoro (15%)	B
7	Garita (50%)-Traveler (40%)-Luhon (10%)	$B - B^+$
8	Ryan Park (50%)-Space City (30%)	$A^- - B^+$
9	Cumbres (30%)-Empedrado (30%)-Curecenti (20%)	$B - C^+$
10	Bushvalley (40%)-Youga (20%)-Jerry (15%)	$D^+ - C^-$
11	Seitz (60%)-Bushvalley (20%)	$B^- - C^+$
12	Luhon (35%)-Garita (30%)-Traveler (22%)	$B - B^+$
13	Celeste (40%)-Tolman (25%)-Empedrado (20%)	A^-
14	Seitz (45%)-Embargo (25%)-Fulcher (20%)	B
15	Cryoborolls (40%)-Argiborolls (35%)	B
16	Haploborolls (60%)-Argiborolls (30%)	$B^- - B$
17	Stunner (40%)-Luhon (25%)-Monte (20%)	$A^- - A$
18	Nortonville (40%)-Alamosa (30%)-La Sauses (30%)	D
19	Comodore (35%)-Celeste (35%)-Rock Outcrop (30%)	$B - B^+$
20	Garita (60%)-Luhon (30%)	$B - B^+$
21	Costilla (45%)-Space City (15%)	A
22	Haplargids (45%)-Calciorthods (30%)-Torriorthents (25%)	A
23	San Arcacio (35%)-Acacio (20%)-Zinger (25%)	C^+
24	Traveler (45%)-Rock Outcrop (15%)-Luhon (15%)	B
25	Cryoboralf (65%)-Rock Outcrop (20%)	B
26	Cryoborolls (60%)-Cryoboralf (30%)	B
27	Cryaquolls	$D - D^+$
28	Cryoborolls	$B^+ - A^-$
29	Rock Outcrop	$C - C^+$
30	Urraca (45%)-Empedrado (30%)-Tolman (25%)	A^-
31	Alamosa (40%)-Vastine (30%)-Fluvaquent (20%)	C^-
32	Hooper (50%)-Corlett (30%)	$C^+ - B^-$
33	Dunnul (65%)-Graypoint (20%)-Derrick (15%)	A
34	Cotopaxi (85%)-Dune Land (15%)	A^-

1/ The map reference numbers refer to figure II-6, pp.II-28 f.

Potential Range Productivity

Table II-11 (p.II-26) indicates the potential range productivity by soil associations in the San Luis Resource Area. The potential productivity of each association is an estimate of the number of pounds of total vegetation (dry unit weight) that could be produced in each association. The total potential productivity of national resources lands with intensive management (AMPs) is estimated to be 375,196,000 pounds of vegetation.

Present Erosion Condition

The number of acres of NRL occurring in each erosion condition class for allotments scheduled for intensive grazing management is as follows: stable--24,127 acres; slight--237,736 acres; moderate--197,393 acres; and critical--14,660 acres. Table II-14 identifies the erosion condition class for each proposed or existing AMP.

The nine management units (5,930 acres) that have been proposed to have grazing eliminated have 160 acres in the stable erosion condition class; 4,590 acres in the slight erosion condition class; 650 acres in the moderate class; and 530 acres in the critical class.

The breakdown of the erosion condition classes for the 16,625 acres proposed for custodial management is as follows: slight--9,895 acres; moderate--5,290 acres; and critical--1,440 acres.

Of the 14,200 acres of unallotted range, 6,650 acres are classified as slight, 710 as moderate, and 6,840 as critical.

TABLE II-14. EROSION CONDITION CLASSES FOR PROPOSED AND EXISTING ALLOTMENT MANAGEMENT UNITS

Management Unit		Stable (acres)	Slight (acres)	Moderate (acres)	Critical (acres)
1P	Poncha Pass		1,825	100	
2E	Arizona-Colorado			12,173	
4P	West Clover Creek		160		
7P	Alder		1,349		
9E	Turquoise Gulch		3,806		
10E	Kelly Creek		6,699		
11P	Kerber Creek		4,500		
14E	Noland Gulch		7,650		
15P	Nye		1,460		
16P	East & West San Luis Creek	274	2,329	137	
22P	Piney Creek	251	2,259		
23P	Steel Creek	894	224	3,354	
24P	Mirage		958	1,437	
25E	Valley View Hot Springs			4,927	
28P	Cotton Creek			3,880	
31P	Hutchinson			835	
34P	Mineral Hot Springs		8,721	1,539	
36P	McIntyre Gulch		2,301	2,301	
39P	Findley Gulch		9,076	2,269	
41P	Laughlin Gulch		3,986	2,657	
42P	Poison Gulch		2,924	11,433	
45P	Cross Creek		6,305		
46P	Trickle Mountain	1,956	3,913	13,693	
47P	Sheep Creek	2,031			
48P	Taylor Canyon	1,929		973	
50P	Rabbit Canyon		755	3,080	
51E	Saguache Park		1,152	768	
52P	Hat Springs		4,564		
53P	Robb Ranch		1,488		
55P	Mill Hill		4,167		
56P	Higgins Spring		753		
57P	Mitchell		938		
58P	West Tracy Ridge		925		
59P	Tracy Ridge		893		
60P	Tracy Cattlemen's	8,325	5,550	13,874	
61P	Tracy Individual	84	1,592		
63P	Biedell Creek	246	2,216		
64P	East of Carnero Creek	2,370	4,740	4,739	
65P	Upper Coolbroth		1,780		
66P	Lower Coolbroth		605		
67P	Carnero Creek		2,318		
68P	La Garita		1,082		
69P	Elephant Rocks			3,517	
70P	Rio Grande Canal		218	4,142	
73P	Alder Creek		275		
76P	Sanderson		510		
77P	Bowen		488		
78P	Schrader Creek		640		

TABLE II-14. EROSION CONDITION CLASSES FOR PROPOSED AND EXISTING ALLOTMENT MANAGEMENT UNITS (cont.)

	Management Unit	Stable (acres)	Slight (acres)	Moderate (acres)	Critical (acres)
79P	Branch		2,457		
80P	Pup Peak		5,002		
81P	Limekiln		2.525	2,525	
82P	Nicomodes		2,772	308	
83P	Raton Creek		3,940		
84P	Rock Creek		10,036	2,644	
85P	McMahon		7,508	7,508	
86P	Greenie Mountain		4,868	3,246	
87P	Gato-Hutchinson		160	1,800	
88P	Triangle		1,857	1,858	
89P	Alamosa River			760	
93P	Posito Creek		249	4,742	
94P	Jadero Flat		4,420	260	520
95P	Poso Creek		112	2,128	
96P	Capulin			5,589	
97P	Romero Canyon		1,730		
98P	Ra Jadero Canyon		6,057		673
99P	Cinder Pits		1,537	13,833	
100E	Ciscom Flat		3,680		
102P	La Jara Creek		820		
106P	Little Mogotes		5,404	8,106	
107P	Grande	2,964	790	196	
108P	Mogote Flat		1,582	395	
109P	Poso		1,048	4,192	
110P	Los Mogotes		6,793	751	
111P	Big Horn Creek		76		684
112P	Railroad				3,741
113P	Llano				5,261
115P	Alta Lake		5,723	5,723	
116E	Twin Lakes		8,153		
117P	River		2,324		
119P	South Valley		1,710	90	
120P	Pinon		2,163	5,047	
121E	Kiowa Hills			4,302	
122P	Braiden		480	480	
123P	Eight Mile		2,820	2,820	
124P	Pinon Hills			9,274	
125P	Rio Grande Common		7,444	9,306	1,861
126P	La Sauses		1,280		1,920
129P	Rio Grande		2,975		
132P	Four Mile		320		
133P	Tobin Creek		5,820	306	
134P	Foothills		1,880	2,820	
137P	Blanca	519	2,595	2,106	
138P	Dry Lakes	2,284	3,552	2,996	
141P	Zapata Falls		2,995	2,996	
159P	Klondyke		1,169		
	TOTAL	24,127	237,736	197,393	14,660

Water

Runoff from snowmelt on the surrounding mountains and precipitation on the valley floor annually supply to the San Luis Valley 2.5 million acre-feet of water (Davis Engineering Service, Inc. 1974). According to the U.S. Geological Survey, approximately 2 million acre-feet are discharged from the valley by evapotranspiration and ½ million acre-feet leave the valley via groundwater underflow and stream flow across the Colorado-New Mexico state line (Davis Engineering Service, Inc. 1974). A general water budget for the San Luis Valley is given in figure II-7.

Evapotranspiration

Evaporative demand is high in the San Luis Valley throughout the year. Below 9,000 feet most rainfall goes toward satisfying the soil water deficit. Storm events of less than 0.05 inch are probably lost to evaporation directly due to interception by vegetation and litter. Snowfall on south-facing slopes below 11,000 feet and on north-facing slopes below 10,000 feet generally does not produce runoff. Because of high sublimination rates and high soil water deficits, the snowpack in these areas is ephemeral. Heavy late-spring snowfalls may produce localized runoff anywhere in the valley.

Evapotranspiration is nearly equal to precipitation. Figure II-8 depicts this water deficit for the Alamosa area for the period 1961-1967.

Runoff

Runoff will occur whenever the rainfall rate or the snowmelt rate

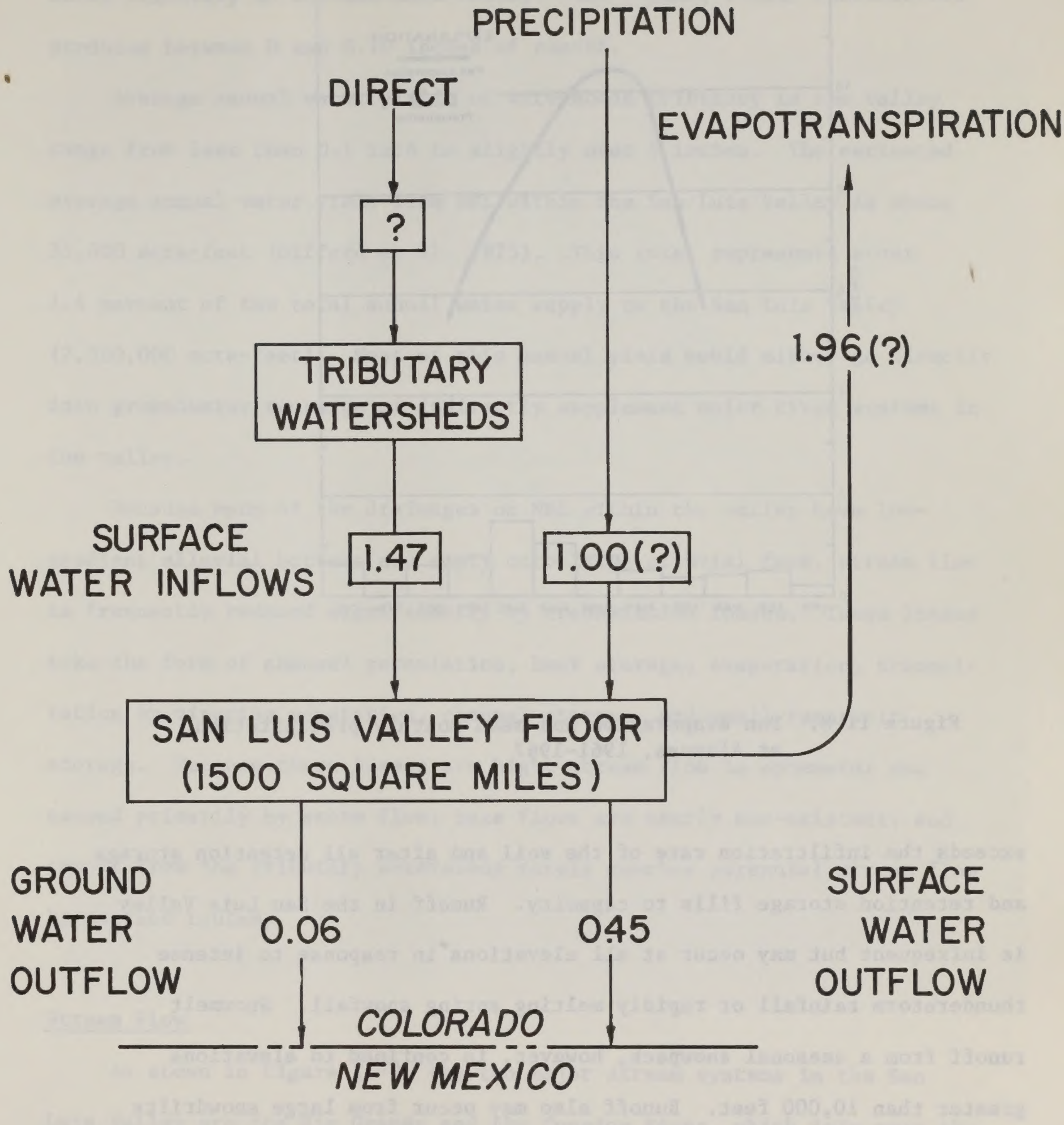


Figure II-7. General water budget for the San Luis Valley (U.S.G.S., cited by Davis Engineering Service, Inc. 1974). Units are one million acre-feet.

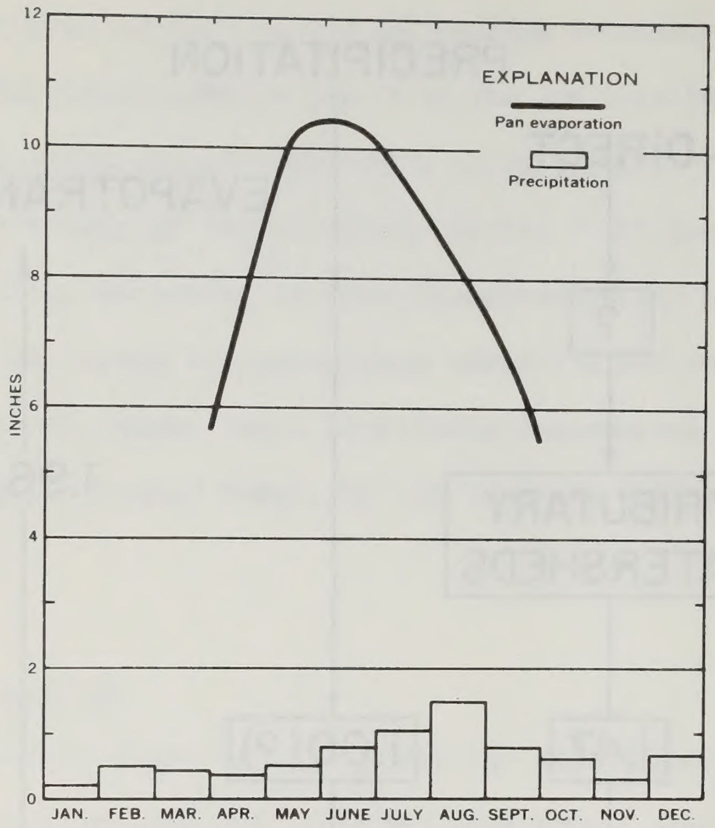


Figure II-8. Pan evaporation and mean monthly precipitation at Alamosa, 1961-1967

exceeds the infiltration rate of the soil and after all detention storage and retention storage fills to capacity. Runoff in the San Luis Valley is infrequent but may occur at all elevations in response to intense thunderstorm rainfall or rapidly melting spring snowfall. Snowmelt runoff from a seasonal snowpack, however, is confined to elevations greater than 10,000 feet. Runoff also may occur from large snowdrifts at mid-elevations, particularly on the lee sides of ridges.

Based upon storm runoff calculations, the 50-year, 24-hour storm event will produce between 0 and 0.50 inches of runoff on small watersheds tributary to the San Luis Valley. The 5-year, 2-hour thunderstorm produces between 0 and 0.10 inches of runoff.

Average annual water yields of watersheds tributary to the valley range from less than 0.1 inch to slightly over 5 inches. The estimated average annual water yield from NRL within the San Luis Valley is about 35,000 acre-feet (Gifford et al. 1975). This total represents about 1.4 percent of the total annual water supply to the San Luis Valley (2,500,000 acre-feet). Most of this annual yield would either go directly into groundwater recharge or indirectly supplement major river systems in the valley.

Because many of the drainages on NRL within the valley have low-gradient alluvial bottoms and empty onto large alluvial fans, stream flow is frequently reduced significantly by transmission losses. These losses take the form of channel percolation, bank storage, evaporation, transpiration by riparian vegetation, channel storage, and small reservoir storage. Because these losses are high, stream flow is ephemeral and caused primarily by storm flow; base flows are nearly non-existent; and runoff from the tributary watersheds rarely reaches perennial stream flow by surface routes.

Stream Flow

As shown in figure II-9, the two major stream systems in the San Luis Valley are the Rio Grande and the Conejos River, which join near the community of La Sauses. These streams have been gauged since 1890 and 1912, or 84 and 62 years, respectively.

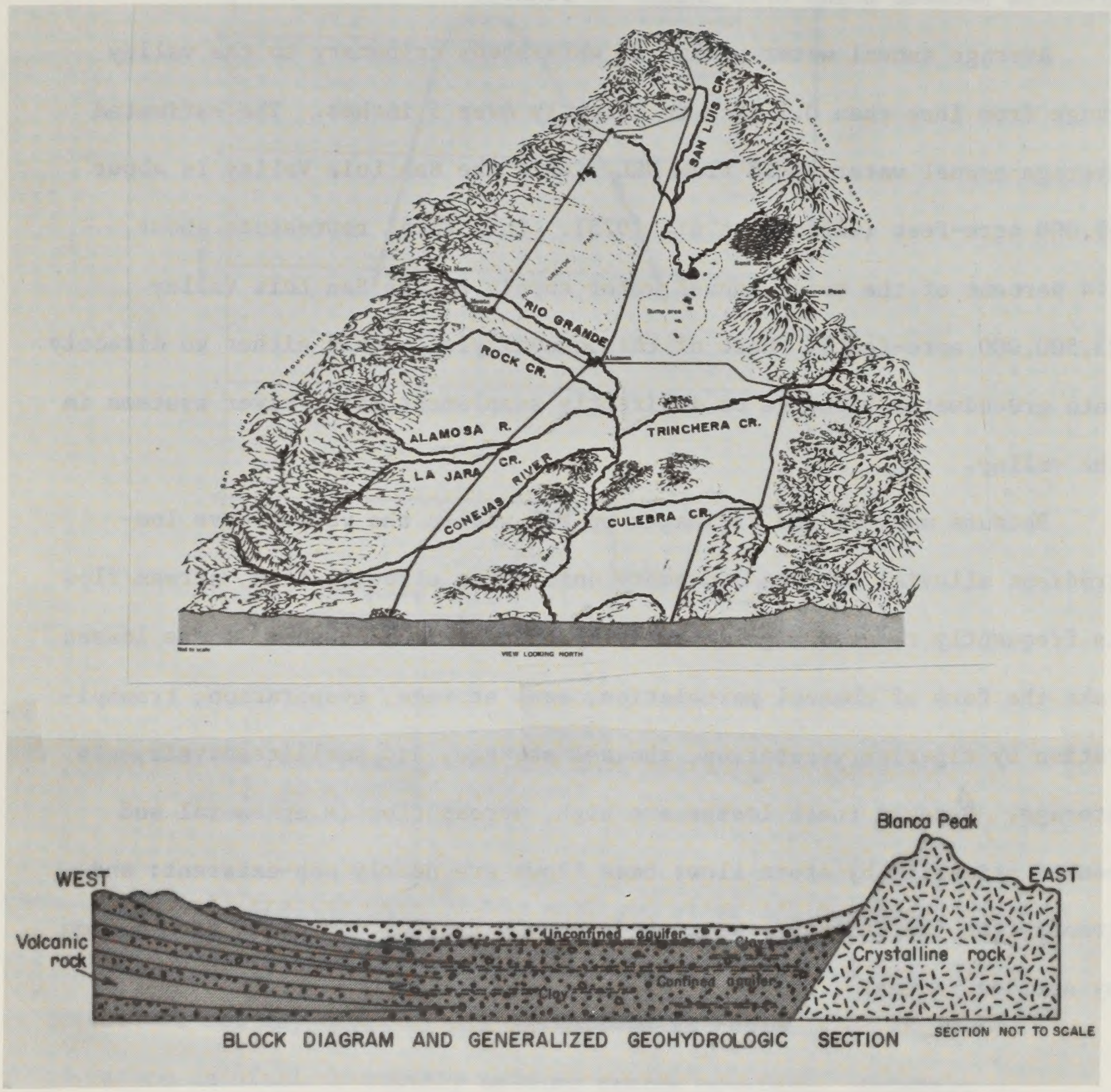


Figure II-9. Block diagram and generalized geohydrologic section of the San Luis Valley

The average annual flow of the Rio Grande measured at the Del Norte gauging station from 1890 through 1935 was 707,365 acre-feet; from 1936 through 1972 it had decreased to 589,065 acre-feet--a reduction of 118,300 acre-feet. The average annual flow of the Conejos River measured at the Mogote gauging station from 1912 through 1935 was 271,595 acre-feet; from 1936 through 1972 it was 223,635 acre-feet--a decrease of 47,930 acre-feet.

The gauging station near Lobatos, on the Rio Grande, was installed in 1900--its first full year in operation. For the next 63 years the average annual flow at Lobatos was approximately 459,048 acre-feet. During the next eleven years, 1963 to 1973 inclusive, however, the average annual flow measured at Lobatos decreased to 273,055 acre-feet. These diminished flows may be the combined result of a "dry" weather cycle, increased demands on subsurface aquifers, and diversions.

The combined flows of these two rivers amount to approximately 36 percent of the total water available to the Rio Grande Basin. Diversions from these rivers account for the bulk of the surface water available for agricultural, domestic, and industrial uses, since much of the precipitation occurs in undeveloped areas of the valley where there is no demand for these uses. See table II-15 for a listing of the streams (intermittent or perennial) that have some drainage from NRL.

Groundwater

Groundwater in the San Luis Valley is obtained from unconfined and confined aquifers (see figure II-9, p.II-45). These aquifers contain an

TABLE II-15. NAMED STREAMS FLOWING INTO THE SAN LUIS VALLEY ON NRL

Name	Tributary of	Coordinates	Miles on NRL	Flow on NRL	Name	Tributary of	Coordinates	Miles on NRL	Flow on NRL
McIntyre Canyon	Saguache Creek	T 45 N, R 8 E	2.5	I	Turquoise Gulch	San Luis Creek	T 47 N, R 9 E	1.8	P
Proffit Gulch	Schecker Gulch	T 45 N, R 8 E	1.0*	I	Wild Bill Gulch	Turquoise Gulch	T 47 N, R 9 E	2.0	I
Schecker Gulch	Saguache Creek	T 45 N, R 8 E	2.5	I	Spring Creek	San Luis Creek	T 47 N, R 8 E	0.3	P
DeTilla Gulch	Saguache Creek	T 45 N, R 8 E	4.0	I	Alder Creek**	San Luis Creek	T 48 N, R 8 E	0.3	P
Big Hollow Gulch	Saguache Creek	T 45 N, R 9 E	2.5	I	Round Hill Gulch	San Luis Creek	T 48 N, R 8 E	1.8	I
Stonehouse Gulch	Big Hollow Gulch	T 45 N, R 9 E	2.5	I	Unnamed (Sec. 15, 16, 21)	San Luis Creek	T 48 N, R 8 E	2.0	P
Noland Gulch	San Luis Creek	T 46 N, R 9 E	3.0	I	Fisher Creek**	San Luis Creek	T 48 N, R 8 E	0.5	P
Kerber Creek**	San Luis Creek	T 46 N, R 8 E	0.5	P	San Luis Creek**	San Luis Reservoir	T 48 N, R 8 E	0.5	P
Limekiln Gulch	Kerber Creek	T 46 N, R 9 E	1.0*	I	Dorsey Creek**	San Luis Creek	T 48 N, R 8 E	0.5*	P
Graveyard Gulch	Little Kerber Creek	T 46 N, R 8 E	0.5	I	Lone Tree Creek	San Luis Creek	T 48 N, R 8 E	0.4	P
Little Kerber Creek	Kerber Creek	T 46 N, R 8 E	0.2	P	Swidinski Creek**	San Luis Creek	T 48 N, R 8 E	0.5	P
Columbia Gulch	Little Kerber Creek	T 46 N, R 8 E	0.5	I	Merkt Creek	San Luis Creek	T 48 N, R 9 E	0.3	I
Tennessee Gulch	Kerber Creek	T 46 N, R 8 E	0.6	I	Decker Creek	San Luis Creek	T 48 N, R 9 E	2.0	I
Euclid Gulch	Kerber Creek	T 46 N, R 8 E	0.2	I	North Decker Creek	Decker Creek	T 48 N, R 9 E	0.8	I
Elkhorn Gulch	Kerber Creek	T 47 N, R 7 E	0.3	P	Rock Creek	San Luis Creek	T 47 N, R 9 E	2.5	I
Chloride Gulch	Kerber Creek	T 46 N, R 7 E	0.2	I	Yankee Creek	Rock Creek	T 47 N, R 9 E	1.3	I
Express Gulch	Kerber Creek	T 46 N, R 8 E	1.0	I	Bolton Creek	Rock Creek	T 47 N, R 9 E	1.0	I
Sawmill Gulch	Kerber Creek	T 46 N, R 8 E	0.2	I	Nieland**	Rock Creek	T 47 N, R 9 E	0.7	I
Soda Springs Gulch	Kerber Creek	T 46 N, R 8 E	0.8	I	Butterfly Creek	Rock Creek	T 47 N, R 9 E	1.2	I
Cottonwood Creek**	Kerber Creek	T 46 N, R 8 E	0.9	I	Raspberry Creek	Rock Creek	T 47 N, R 9 E	1.7	I
Peterson Creek**	San Luis Creek	T 47 N, R 9 E	1.4	I	Brook Creek	Rock Creek	T 47 N, R 9 E	2.0	I

* Intermittent ownership
** Streams surveyed in 1975
I = Intermittent water
P = Permanent water

TABLE II-15. NAMED STREAMS FLOWING INTO THE SAN LUIS VALLEY ON NRL (cont.)

Name	Tributary of	Coordinates	Miles on NRL	Flow on NRL	Name	Tributary of	Coordinates	Miles on NRL	Flow on NRL
Cook Creek	Rock Creek	T 47 N, R 9 E	1.0	I	Zapata Creek	Dry Lakes	T 28 S, R 73 W	0.2	I
Miller Creek	Cook Creek	T 47 N, R 9 E	1.5	I	Axtel Canyon	South Zapata Creek	T 28 S, R 73 W	0.2	I
Jack Gulch	Rock Creek	T 47 N, R 9 E	1.5	P	South Zapata Creek**	Dry Lakes	T 28 S, R 73 W	0.8*	I
Carr Gulch	Rock Creek	T 47 N, R 10 E	2.0	P	Urracco Creek	Dry Lakes	T 28 S, R 73 W	0.5	I
Euclid Gulch	Rock Creek	T 47 N, R 10 E	1.5	I	Pioneer Creek	Dry Lakes	T 28 S, R 73 W	0.2	I
Hayden Pass	San Luis Creek	T 46 N, R 10 E	0.2	I	Holbrook Creek	Dry Lakes	T 29 S, R 73 W	2.4	I
Silver Creek	San Luis Creek	T 46 N, R 10 E	0.5*	I	Chokecherry Canyon	Dry Lakes	T 29 S, R 73 W	1.5	I
Piney Creek	San Luis Creek	T 46 N, R 10 E	0.5	I	Box Canyon	Dry Lakes	T 29 S, R 73 W	2.5	I
Steel Canyon**	San Luis Creek	T 46 N, R 10 E	1.3*	I	Rio Grande**	Gulf of Mexico		12.0	P
Lime Canyon	San Luis Creek	T 46 N, R 10 E	5.0	I	Fox Creek	Conejos River	T 33 N, R 7 E	1.0*	P
Black Canyon	Orient Canyon	T 46 N, R 10 E	3.0	I	La Jara Creek**	Alamosa River	T 34 N, R 6 E	2.5*	P
Orient Canyon	San Luis Creek	T 46 N, R 10 E	1.5	I	Leandro Canyon	La Jara Creek	T 34 N, R 7 E	1.5*	I
Hot Springs Canyon	Garner Creek	T 45 N, R 10 E	1.0	I	Vincente Canyon	La Jara Creek	T 34 N, R 7 E	0.5	I
Garner Creek**	San Luis Creek	T 45 N, R 10 E	2.0*	P	Ra Jadero Canyon	La Jara Creek	T 34 N, R 7 E	6.0*	I
Cotton Creek**	San Luis Creek	T 45 N, R 10 E	0.8	P	Poso Creek	La Jara Creek	T 35 N, R 7 E	5.3*	I
Spring Creek	Wild Cherry Creek	T 45 N, R 11 E	0.6	I	Ojito Creek	Hot Creek	T 35 N, R 7 E	1.3	I
Rito Alto Creek	San Luis Creek	T 44 N, R 11 E	0.2	P	Alamosa River**	Rio Grande	T 36 N, R 6 E	2.0	P
Marshall Gulch	San Luis Creek	T 44 N, R 11 E	0.2	I	Cat Creek	Monte Vista Canal	T 36 N, R 7 E	0.5	P
Burnt Gulch	North Crestone Creek	T 43 N, R 12 E	0.2	I	Fulcher Gulch	Cat Creek	T 37 N, R 7 E	4.0	I
Short Creek	Pole Creek	T 25 S, R 73 W	0.2	P	Spring Gulch	Monte Vista Canal	T 37 N, R 7 E	4.0	I
North Arrastre Creek	Zapata Creek	T 27 S, R 73 W	0.7	I	Burnt Gulch	Rock Creek	T 37 N, R 6 E	1.5	I
South Arrastre Creek	Zapata Creek	T 27 S, R 73 W	1.3	I	Rock Creek	Monte Vista Canal	T 38 N, R 7 E	0.5*	P
Tellurium Gulch	Zapata Creek	T 27 S, R 73 W	0.8	I	Dry Creek	Monte Vista Canal	T 38 N, R 6 E	1.6*	I
North Zapata Creek	Zapata Creek	T 27 S, R 73 W	1.8*	I	Nicomodes Gulch	Monte Vista Canal	T 39 N, R 6 E	2.5*	I

TABLE II-15. NAMED STREAMS FLOWING INTO THE SAN LUIS VALLEY ON NRL (cont.)

Name	Tributary of	Coordinates	Miles on NRL	Flow on NRL
Limekiln Creek	Monte Vista Canal	T 39 N, R 6 E	4.0	I
Carnero Creek	Rio Grande Canal	T 42 N, R 6 E	0.3	P
Coolbroth Canyon	Carnero Creek	T 42 N, R 5 E	3.0*	I
Dry Gulch	Carnero Creek	T 42 N, R 5 E	1.4	I
Biedell Creek**	Rio Grande Canal	T 42 N, R 6 E	4.5*	I
Sanderson Gulch	Rio Grande Canal	T 43 N, R 6 E	3.5*	I
Cottonwood Creek	Rio Grande Canal	T 43 N, R 6 E	5.0*	I
Little Cottonwood Creek	Cottonwood Creek	T 43 N, R 6 E	4.0*	I
San Juan Creek	Rio Grande Canal	T 43 N, R 6 E	1.7	I
Red Rock Canyon	Rio Grande Canal	T 43 N, R 6 E	2.5*	I
Tracy Canyon	Rio Grande Canal	T 44 N, R 7 E	3.0*	I
North Tracy Canyon	Tracy Canyon	T 44 N, R 7 E	4.0	I
Boland Canyon	Laughlin Gulch	T 44 N, R 6 E	1.5*	I
Laughlin Gulch	Saguache Creek	T 45 N, R 6 E	2.0	I
Mill Creek**	Saguache Creek	T 45 N, R 6 E	0.7	I
Houselog Creek	Hodding Creek	T 45 N, R 6 E	0.5	P
Spring Gulch	Hodding Creek	T 45 N, R 6 E	0.4	P
Big Dry Gulch	Saguache Creek	T 45 N, R 5 E	0.8	I
Squaw Creek**	Saguache Creek	T 44 N, R 5 E	2.5	I
Hat Springs Creek**	Saguache Creek	T 44 N, R 4 E	1.8	P
Saguache Creek	San Luis Reservoir	T 44 N, R 5 E	0.5*	P
Fourmile Creek	Saguache Creek	T 44 N, R 4 E	0.8	P
Rabbit Canyon	Saguache Creek	T 45 N, R 4 E	1.5	I
Taylor Canyon	Sheep Creek	T 45 N, R 4 E	2.0	I
East Pass Creek**	Sheep Creek	T 45 N, R 5 E	1.2	I
Sheep Creek**	Saguache Creek	T 46 N, R 5 E	2.0	P
Antelope Creek**	Sheep Creek	T 46 N, R 5 E	3.5	I
Lone Tree Gulch	Saguache Creek	T 45 N, R 5 E	3.3	I
Chico Gulch	Jacks Creek	T 45 N, R 5 E	3.5	I
Houghland Gulch	Jacks Creek	T 46 N, R 5 E	1.8	I
Ward Gulch	Jacks Creek	T 46 N, R 5 E	2.3	I
Cross Creek**	Jacks Creek	T 46 N, R 6 E	0.5	P
Cabin Draw	Middle Creek	T 46 N, R 6 E	2.5	I
Spring Gulch	Middle Creek	T 46 N, R 6 E	0.6	P
Horse Canyon	Middle Creek	T 46 N, R 6 E	0.8	P
Ford Creek**	Saguache Creek	T 46 N, R 6 E	3.5*	P
Baxter Creek**	Ford Creek	T 46 N, R 6 E	1.5	I
Tuttle Creek**	Ford Creek	T 46 N, R 7 E	2.0	P
Mill Gulch	Ford Creek	T 46 N, R 7 E	2.0	I
Poison Gulch	Saguache Creek	T 45 N, R 6 E	4.0	I
Dry Gulch	Saguache Creek	T 45 N, R 7 E	5.0	I
Findley Gulch	Saguache Creek	T 45 N, R 7 E	3.5	I

Total miles of named streams on NRL	230.4
Total miles of permanent streams on NRL	47.3
Total miles of intermittent streams on NRL	183.1

unknown but large amount of water in storage in the upper 6,000 feet. They are separated by a confining "clay series" or by confining layers of volcanic rocks. These confining beds are discontinuous and lenticular, so it is difficult to differentiate between unconfined and confined aquifers, except locally. This discontinuity in the "clay series" creates varying degrees of hydraulic connection between the aquifers.

Shallow unconfined groundwater occurs nearly everywhere in the valley and extends 50 to 200 feet beneath the land surface. The depth to water in approximately one-half of the area of the valley floor is less than 12 feet. Although this shallow water is easily obtained, much of it is of relatively poor quality and has limited use. In addition, this water is extremely susceptible to pollution from septic tank filter fields, particularly in areas of population concentrations.

Recharge to the unconfined aquifer is mainly by infiltration of applied irrigation water, leakage from canals and ditches, deep percolation from the main streams entering the valley, and precipitation on the valley floor. Upward leakage from the confined aquifer is also a source of recharge, although at this time the source is not considered to be substantial. Discharge from this aquifer is by wells, evapotranspiration, and seepage to streams.

The principal source of recharge to the confined aquifers is seepage from mountain streams that flow across the alluvial fans flanking the valley floor. The "clay series" is absent at the edge of the valley, permitting recharge to beds that constitute the confined aquifer in the main part of the valley. The mountain streams show significant losses as they cross the porous surface of the fans.

For instance, measurements on Crestone, South Crestone, Willow, Spanish, Cottonwood, and Deadman creeks--all located on the west flank of the Sangre de Cristo Range in Saguache County--were taken weekly through much of 1953 and 1954. These measurements (mentioned by Davis Engineering Service, Inc. 1974) were taken above and below the alluvial fans formed by these creeks to determine transmission losses. The losses for each of these creeks between the upper and the lower stations where measurements were taken between April 26 and September 11, 1954, were found to be as follows: Crestone Creek--1,753 acre-feet, or 35.3 percent of the measured flow; South Crestone Creek--655 acre-feet, or 80.5 percent; Willow Creek--927 acre-feet, or 40.2 percent; Spanish Creek--1,057 acre-feet, or 94.9 percent; Cottonwood Creek--1,751 acre-feet, or 72.2 percent; and Deadman Creek--1,939 acre-feet, or 58.8 percent. There has been no determination as to what proportion of this loss is by evapotranspiration, recharge of unconfined aquifers, and recharge of confined aquifers; however it is believed most of the losses measured were for recharge of confined aquifers.

Quality of Waters

Water quality data are not available from any watersheds that are influenced 100 percent by BLM management decisions. Available water quality data from major river systems in the valley (as available from STORET), combined with water quality information from the Colorado Department of Health (1974), indicate that chemical and biological characteristics of runoff waters from BLM lands in the valley would normally present no problems in terms of irrigation, groundwater recharge, or recreation use.

Even during low flow in streams of the Rio Grande Basin when water quality is lowest, the water quality conditions are currently equal to or exceeding the applicable water quality standards with the exception of the Rio Grande below Monte Vista.

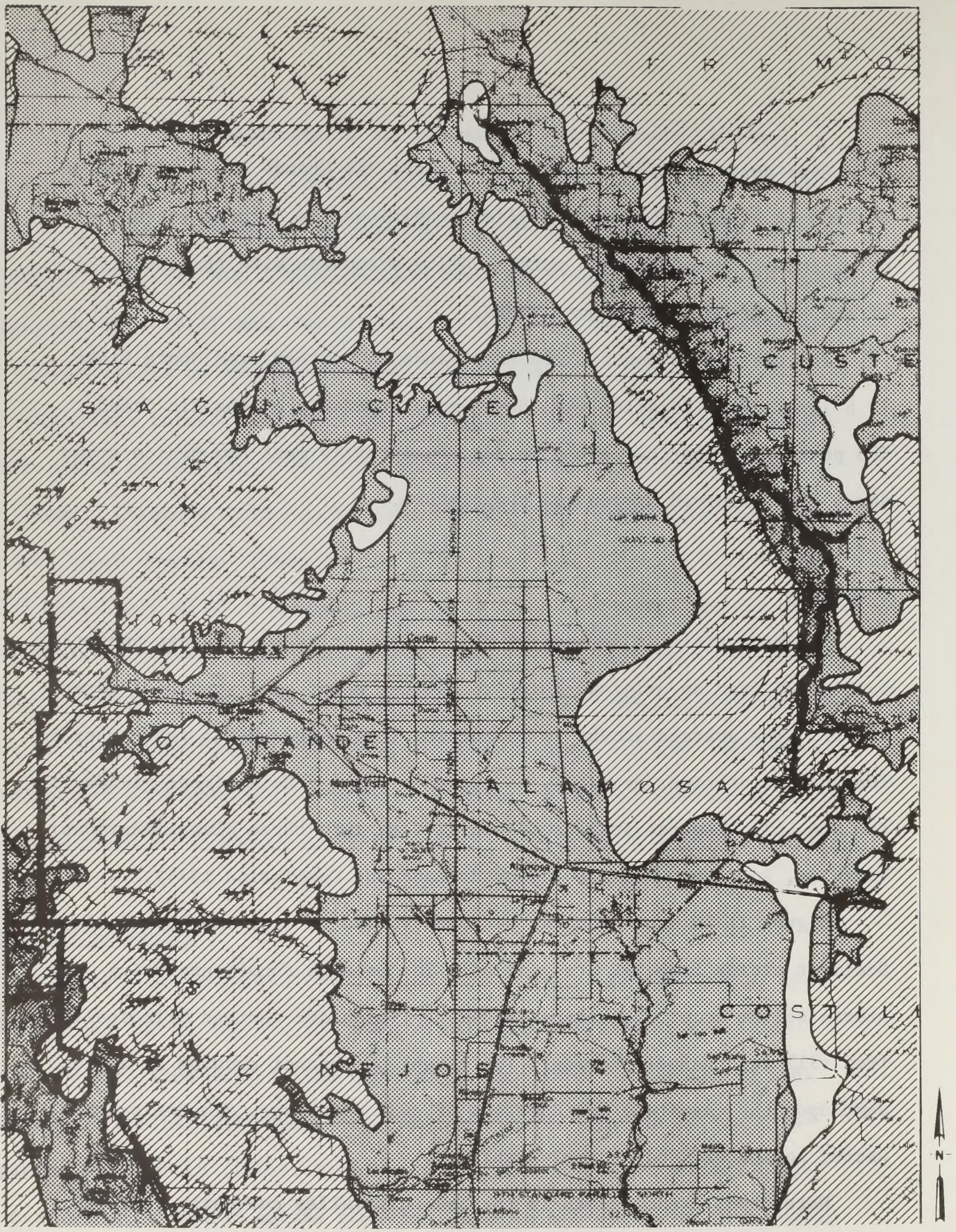
The classification for the Rio Grande downstream from Monte Vista is a lower classification than New Mexico standards on the Rio Grande. The parameters that currently do not consistently meet New Mexico standards are dissolved oxygen and temperature.

Sediments

Sediment yield is defined in this statement as the average amount of soil moved from an original point to another point as a result of water runoff. The average amount is calculated from measurements taken over a long period of time, generally 25 years or more. The sediment yields for the San Luis Resource Area have been divided into three classifications: very-low, low, and moderate (Colorado Land Use Commission 1974).

Figure II-10 shows general sediment yields for the San Luis Valley. Sediment yields from NRL are generally low because runoff-producing storms seldom occur. Watershed sediment yields are derived principally from rill and channel erosion. The extent of channel erosion is dependent upon the magnitude and duration of peak discharge, flow velocities, wetted perimeter, and channel stability.

Watersheds draining NRL in the San Luis Valley currently contain stream channels in a wide range of stability classes. Channel stability classes--good, fair, and poor--are used to describe the stability of



☐ Moderate yield (0.2-0.5 acre feet/mi^2/year).

▨ Low yield(0.1-0.2 acre feet/mi^2/year).

▩ Very low yield (less than 0.1 acre feet/mi^2/year).

(Colorado Land Use Commission 1974).

Figure II-10. Average annual sediment yields for parts of the San Luis Valley.

streams located on NRL in the San Luis Valley. The following are descriptions of these classes (Pfankuch 1975).

Good refers to conditions on upper and lower banks and bottom materials. Bank slope gradient is 30 to 40 percent. Mass wasting evidence is either infrequent or very slight. Debris jam potential on upper banks is restricted to small twigs or limbs. Upper banks are well vegetated (40 to 65 percent). Channel capacity is adequate. Lower banks contain some flow obstructions. Intermittent lower bank-cutting is present. Some new increase in bar formation is evident, mostly from course and fine gravels. Only 5 to 30 percent of the stream length is affected by scouring and deposition.

Fair refers to conditions on both upper and lower banks and stream bottoms. Upper bank slope gradient is 40 to 60 percent. Some raw spots eroded by water during high flows are evidence of mass wasting. Upper stream bank debris jam potential is present. Upper bank vegetative protection is worse, approximately 20 to 40 percent density. Channel capacity barely contains present flood peaks. Lower banks possess moderately unstable obstructions and deflectors. Lower bank cutting is significant. Moderate deposition of new materials on old and some new sandbars occurs (fine gravels and course sands). Bottom of channel is 30 to 50 percent affected by scouring and deposition.

Poor refers to conditions on both upper and lower banks and stream bottoms. Upper bank slope gradient is in excess of 60 percent. Mass wasting is significant on upper banks. Upper stream banks debris jam potential contains relatively large sizes. Vegetative protection of upper banks is less than 20 percent. Discontinuous and shallow root masses are present and overbank flows are common when streamflow is present. Lower banks possess frequent obstructions and flow deflectors. Sediment traps are nearly full, and channel migration is occurring. Lower-bank cutting is manifested in relatively frequent failure of bank overhangs and there is extensive deposits of predominantly fine particles on lower banks. More than 50 percent of the stream bottom is in a state of flux.

In general, first-order* stream channels are in a good-to-excellent stability category with few exceptions. Stability of second-order* channels ranges from fair to poor, and third-order* channels are nearly all classed as having poor stability. On the west side of the valley, third-order channels and some second-order channels are incised in alluvium. Bank and bed materials in these alluvial channels are of a small size and large organic debris is scarce, so flow velocities remain high. Figure II-11 shows a second-order channel exhibiting poor stability in the headwaters of South Ra Jadero Canyon. In contrast, figure II-12 shows a first-order channel in good condition in the headwaters of Red Rock Canyon. Poor channel stability in the San Luis Valley is basically a reflection of past land-use practices. Both severe grazing and extensive timber cutting, common in the late 1800s and early 1900s, apparently resulted in increases in storm runoff.

Land abuses of that period coupled with a few intense runoff-producing storms are concluded to have caused the severe gully development evident in the San Luis Valley watersheds today. Any intermittent stream

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* see Glossary

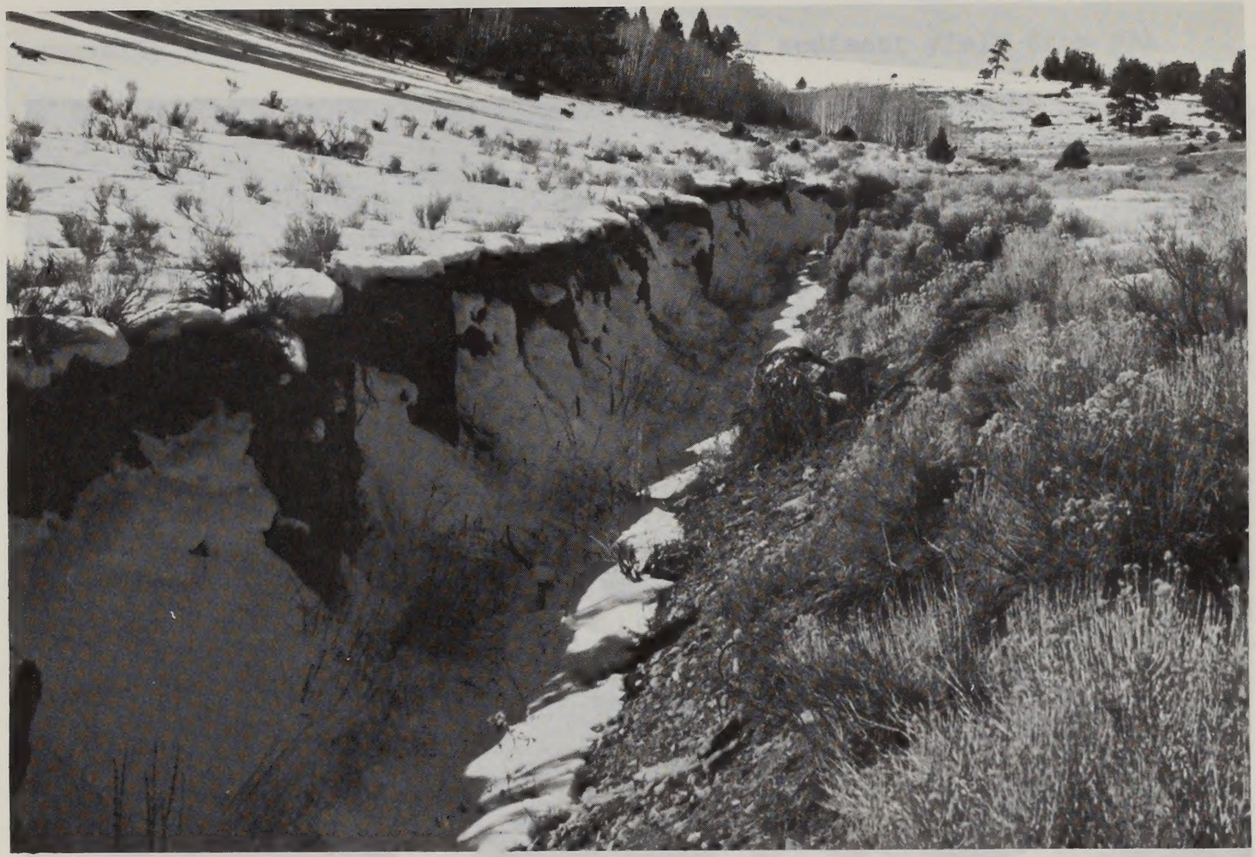

Figure II-11. Second-order channel in South Ra Jadero Canyon

flow in these poor stability channels will be characterized by high turbidities and high suspended sediment loads at the higher stages. At

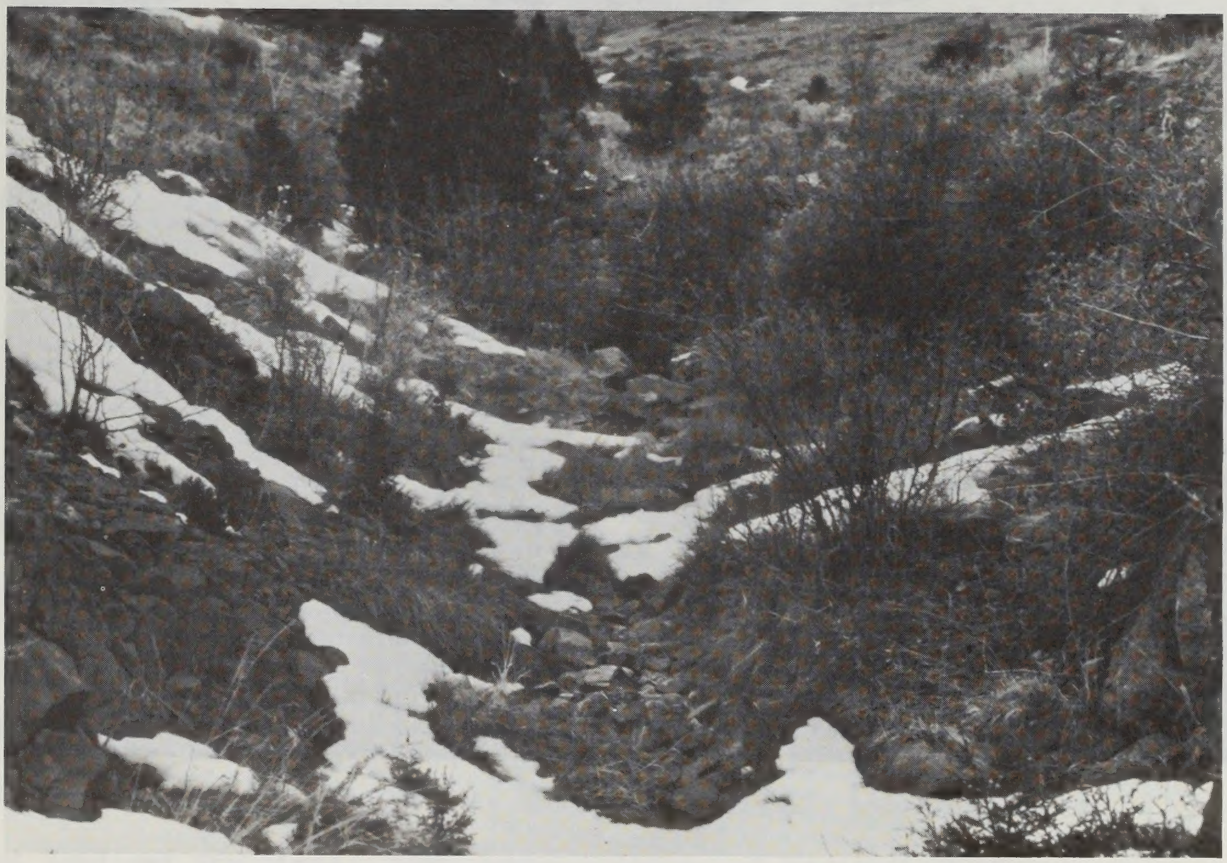

Figure II-12. First-order channel in Red Rock Canyon

lower stages, turbidity and suspended sediment will drop off considerably, particularly where channel gradients are slight.

Figure II-10, (p.II-53) shows the areas where the three classifications of sediment yield occur in the resource area. The sediment yield in the very-low sediment yield areas would amount to 0.3 ton per acre annually.* As estimated by observation, the sediment yield from NRL in the low sediment yield areas is at the upper limits of the class--i.e., 0.2 acre foot per square mile per year. Therefore, the annual yield of sediment is approximately 0.6 ton per year. The yield for NRL classified as having a moderate amount of sediment yield is approximately 0.4 acre-foot per square mile, making the annual sediment yield approximately 1.1 tons per acre.

Most of the quantitative data used to determine these yields were compiled from dry reservoirs on small watersheds and were considered to reflect the average weight of volume sediment deposited in the reservoirs. Data for determining the sediment yield were obtained from a variety of sources: (1) a reservoir survey made by the U.S. Soil Conservation Service, U.S. Geological Survey, and the Corps of Engineers; (2) suspected sediment load measurements made by the U.S. Geological Survey, U.S. Bureau of Reclamation, and Corps of Engineers; (3) estimates of sediment yields taken from the Pacific Southwest Inter-Agency Committee

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* The procedure used for calculating the change from acre-feet/square mile/year to tons/acre/year is as follows: 43,560 cu. ft. of soil is equivalent to 1 acre-foot of soil. Therefore, 0.1 of an acre-foot is equivalent to 43,560 X 0.1, or 4,356 cu. ft. of soil. It has been estimated that as an average for Area 1, a cubic foot of soil weighs approximately 83 lbs. Therefore, 4,356 cu. ft. X 83 lbs. divided by 2,000 lbs. equals 181 tons from 1 square mile of land; 181 tons divided by 640 acres per square mile equals 0.3 ton per acre.

Procedures; (4) geologic maps; and (5) soils, vegetation, and land use maps prepared by the U.S. Soil Conservation Service. Based on the classes and sediment yield rates described, table II-16 shows the annual sediment yield by soil association in the San Luis Resource Area.

NRL yield an estimated 293,791 tons of sediment annually. The breakdown of this sediment yield by management units is as follows: proposed AMP units--275,378 tons (see table II-17 for sediment yield by AMP); proposed elimination--2,560 tons; custodial management--9,010 tons; and unallotted areas--6,843 tons.

TABLE II-16. ANNUAL SEDIMENT YIELD BY SOIL ASSOCIATION AND CLASS

Map Refer- ences a/	Soil Association	Very Low Sediment Yield (Rate: 0.3 Ton/Acre)		Low Sediment Yield (Rate: 0.6 Ton/Acre)		Moderate Sediment Yield (Rate: 1.1 Tons/Acre)	
		Acres	Yield in Tons	Acres	Yield in Tons	Acres	Yield in Tons
1	Hooper (50%)-Corlett (20%)	14,940	4,482	1,340	804		
2	Costilla (40%)-Space City (40%)	2,020	606	5,140	3,084		
3	Uracca (40%)-Mount Home (40%)-Comodore (20%)	8,080	2,424	2,160	1,296		
4	Cotopaxi (75%)-Dune Land (25%)	3,230	969				
5	Hooper (50%)-Corlett (20%)-Arena (30%)			960	576		
6	Graypoint (65%)-San Arcacio (20%)-Platoro (15%)	640	192	4,880	2,928		
7	Garita (50%)-Traveler (40%)-Luhon (10%)			115,720	69,432		
8	Ryan Park (50%)-Space City (30%)			5,190	3,114		
9	Cumbres (30%)-Empedrado (30%)-Curecenti (20%)	2,620	786	23,230	13,938		
10	Bushvalley (40%)-Youga (20%)-Jerry (15%)	9,960	2,988	24,730	14,838		
11	Seitz (60%)-Bushvalley (20%)	1,420	426				
12	Luhon (35%)-Garita (30%)-Traveler (22%)	360	108	36,740	22,044		
13	Celeste (40%)-Tolman (25%)-Empedrado (20%)			14,650	8,790		
14	Seitz (45%)-Embargo (25%)-Fulcher (20%)			6,000	3,600		
15	Cryoborolls (40%)-Argiborolls (35%)	17,590	5,277				
16	Haploborolls (60%)-Argiborolls (30%)	2,740	822	37,320	22,392	820	902
17	Stunner (40%)-Luhon (25%)-Monte (20%)			12,930	7,758		
18	Nortonville (40%)-Alamosa (30%)-La Sauses (30%)			31,010	18,606	5,660	6,226
19	Comodore (35%)-Celeste (35%)-Rock Outcrops (30%)	7,740	2,322	24,430	14,658	6,000	6,600
20	Garita (60%)-Luhon (30%)			4,160	2,496		

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a/ Map numbers refer to figure II-6, pp.II-28 f.

TABLE II-16. ANNUAL SEDIMENT YIELD BY SOIL ASSOCIATION AND CLASS (cont.)

Map Refer- ences a/	Soil Association	Very Low Sediment Yield (Rate: 0.3 Ton/Acre)		Low Sediment Yield (Rate: 0.6 Ton/Acre)		Moderate Sediment Yield (Rate: 1.1 Tons/Acre)	
		Acres	Yield in Tons	Acres	Yield in Tons	Acres	Yield in Tons
21	Costilla (45%)-Space City (15%)			9,510	5,706		
22	Haplargids (45%)-Calciorthods (30%)-Torriorthents (25%)			500	300		
23	San Arcacio (35%)-Acacio (20%)-Zinger (25%)			280	168		
24	Traveler (45%)-Rock Outcrops (15%)-Luhon (15%)	40	12	5,300	3,180		
25	Cryoboralf (65%)-Rock Outcrops (20%)	4,750	1,425	3,190	1,914	810	891
26	Cryoborolls (60%)-Cryoboralfs (30%)	320	96				
27	Cryaquolls			80	48		
28	Cryoborolls	1,600	480	8,130	4,878		
29	Rock Outcrops			6,470	3,882		
30	Uracca (45%)-Empedrado (30%)-Tolman (25%)	3,440	1,032	23,370	14,022	3,541	3,895
31	Alamosa (40%)-Vastine (30%)-Fluvaquent (20%)			820	492		
32	Hooper (50%)-Corlett (30%)			2,290	1,374		
33	Dunnul (65%)-Graypoint (20%)-Derrick (15%)			6,400	3,840		
34	Cotopaxi (85%)-Dune Land (15%)			1,120	672		
	TOTAL	81,490	24,447	418,050	250,830	16,790	18,514
	Acres 516,371						
	Tons 293,791						

TABLE II-17. SEDIMENT YIELD FROM UNITS WITH PROPOSED AND EXISTING AMPS

AMP		Sediment Yield (tons/year)	AMP		Sediment Yield (tons/year)
1P	Poncha Pass West	1,155	78P	Schrader Creek	384
2E	Arizona-Colorado	6,343	79P	Branch	1,474
4P	West Clover Creek	96	80P	Pup Peak	3,001
7P	Alder	831	81P	Limekiln	3,030
9E	Turquoise Gulch	2,284	82P	Nicomodes	1,848
10E	Kelly Creek	3,310	83P	Raton Creek	2,364
11P	Kerber Creek	2,430	84P	Rock Creek	7,978
14E	Noland Gulch	4,590	85P	McMahon	8,674
15P	Nye	1,241	86P	Greenie Mountain	4,747
16P	East and West San Luis Creek	2,141	87P	Gato-Hutchinson	1,230
			88P	Triangle	2,229
22P	Piney Creek	1,205	89P	Alamosa River	456
23P	Steel Creek	2,147	93P	Posito Creek	2,396
24P	Mirage	1,437	94P	Jadero Flat	3,120
25E	Valley View Hot Springs	2,735	95P	Poso Creek	1,344
			96P	Capulin	3,353
28P	Cotton Creek	2,328	97P	Romero Canyon	519
31P	Hutchinson	501	98P	Ra Jadero Canyon	3,534
34P	Mineral Hot Springs	6,056	99P	Cinder Pits	9,220
36P	McIntyre Gulch	2,554	100E	Ciscom Flat	2,208
39P	Findley Gulch	6,366	102P	La Jara Creek	246
41P	Laughlin Gulch	3,680	106P	Little Mogotes	7,906
42P	Poison Gulch	8,353	107P	Grande	1,304
45P	Cross Creek	3,594	108P	Mogote Flat	1,186
46P	Trickle Mountain	9,774	109P	Poso	3,144
47P	Sheep Creek	1,036	110P	Los Mogotes	3,156
48P	Taylor Canyon	1,698	111P	Big Horn Creek	456
50P	Rabbit Canyon	1,821	112P	Railroad	2,245
51E	Saguache Park	864	113P	Llano	3,157
52P	Hat Springs	2,514	115P	Alta Lake	6,868
53P	Robb Ranch	843	116E	Twin Lakes	4,886
55P	Mill Hill	2,464	117P	River	1,394
56P	Higgins Spring	445	119P	South Valley	6,392
57P	Mitchell	563	120P	Pinon	4,326
58P	West Tracy Ridge	550	121E	Kiowa Hills	2,581
59P	Tracy Ridge	536	122P	Braiden	576
60P	Tracy Cattlemen's	19,896	123P	Eight Mile	3,384
61P	Tracy Individual	1,425	124P	Pinon Hills	5,564
63P	Biedell Creek	1,330	125P	Rio Grande Common	11,167
64P	East of Carnero Creek	6,297	126P	La Sauses	1,920
65P	Upper Coolbroth	534	129P	Rio Grande	1,785
66P	Lower Coolbroth	338	132P	Four Mile	1,838
67P	Carnero Creek	1,370	133P	Tobin Creek	3,557
68P	La Garita	649	134P	Foothills	1,551
69P	Elephant Rocks	2,110	137P	Blanca	1,617
70P	Rio Grande Canal	2,616	138P	Dry Lakes	1,751
73P	Alder Creek	165	141P	Zapata Falls	1,797
76P	Sanderson	306	159P	Klondyke	701
77P	Bowen	293			
				TOTAL	275,378

Vegetative Types

The following information identifies the thirteen broad vegetative types found in the San Luis Resource Area and describes the present condition of each type.* Table II-18 lists acres, percent NRL, and the condition of each type. Figure II-13 shows the distribution of the vegetative types in the resource area.

Half Shrub

Half shrub is the predominant vegetative type growing in the resource area (37.1 percent, or 191,750 acres). The predominant shrub species in this type is snakeweed (Guterrezia sarothrae) and low rabbitbrush (Chrysothamnus greenii). The half-shrub type is found at both high and low elevations. A grass understory composed of blue grama (Bouteloua gracilis), Indian ricegrass (Oryzopsis hymenoides), and ring muhly (Muhlenbergia torreyii) is associated with this type. The half-shrub type is in poor (61 percent) to fair (33 percent) condition, with 6 percent in good condition. Because of heavy past use, the vigor of the most desirable forage species is low. Present productivity is estimated to range between 75 to 100 pounds per acre.

Grassland

Grassland is the second most common vegetation type found in the resource area, occurring on 24 percent of NRL (124,030 acres). Blue grama

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* Appendix 2 includes additional information on terrestrial vegetation in the San Luis Resource Area.

TABLE II-18. SUMMATION OF ACRES, PERCENT NRL, AND CONDITION OF 13 BROAD VEGETATIVE TYPES

Vegetative Type	Acres	Percent of Total NRL	Condition (acres)* Poor	Fair	Good
Grassland	124,030	24.0	35,433	79,915	8,682
Meadow	1,150	0.2	172	748	230
Sagebrush	15,740	3.1	10,540	5.200	0
Mountain Shrub	3,471	0.7	0	694	2,777
Conifer	47,683	9.2	3,335	18,335	26,013
Waste, Rocky	2,629	0.5	1,200	1,429	0
Pinyon-Juniper	99,522	19.3	10,750	65,732	23,040
Broadleaf Trees	1,643	0.3	0	500	1,143
Saltbush	2,054	0.4	900	1,154	0
Greasewood	15,867	3.1	8,067	7,800	0
Winterfat	3,421	0.7	1,368	2,053	0
Half Shrub	191,750	37.1	118,391	63,801	9,558
Annuals	7,411	1.4	4,817	2,594	0
Total	516,371	100.0	194,973	249,955	71,443
Percent		100	38	48	14

* Data taken from Phase I watershed inventory and based on proposed BLM Manual 4412 Range Condition

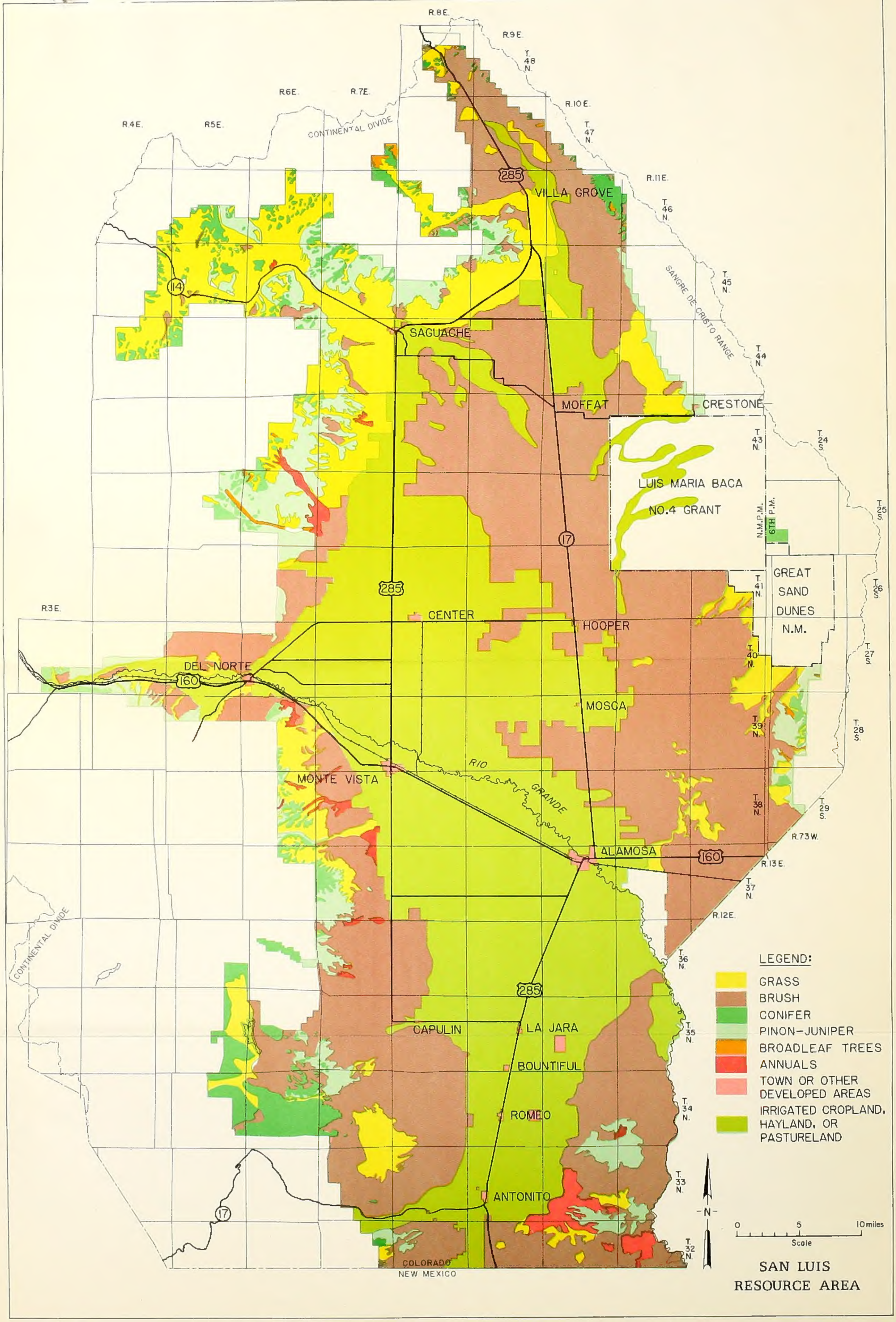


Figure II-13. Vegetative types in the San Luis Resource Area

is the major species within the type. Species occurring in lesser amounts include western wheatgrass (Agropyron smithii), needle-and-thread (Stipa comata), squirreltail (Stianion hystrix), red three-awn (Aristida longiseta), June grass (Koeleria cristata), and ring muhly. At higher elevations the dominant species are Arizona fescue (Festuca arizonica) and mountain muhly (Muhlenbergia montana), intermingled with lesser amounts of other cool-season species.

The grassland type is generally in fair (64 percent) to good (7 percent) condition, with some areas in poor (29 percent) condition. Except on areas with existing AMPs, use may be any time of year. Water is limited or not available for livestock use in many areas. Some grassland areas are not utilized because of lack of water. Areas adjacent to available water are in poor to fair condition. Grassland areas at higher elevations or away from available water are in fair to good condition.

Pinyon-Juniper

The pinyon-juniper type occurs in the foothills areas immediately below the conifer types. It constitutes the third largest type in the area (19.3 percent, or 99,522 acres). Colorado pinyon pine (Pinus edulis) and Utah juniper (Juniperus osteosperma) are the major species. Frequently the understory is dominated by grass, most commonly by blue grama. Other grasses include Indian ricegrass, squirreltail, three-awned, and Scribner's needlegrass (Stipa scribnerii). At lower elevations this type grades into the grassland type, while at higher elevations it grades into the conifers.

The pinyon-juniper type is generally in fair (66 percent) to good (23 percent) condition because of slight use by domestic livestock; 11 percent is in poor condition.

Conifer

The conifer type is found at the higher elevations, adjacent to national forest lands. Douglas fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) constitute the main species in this type, covering 22,618 acres and 23,300 acres respectively. Limited amounts of white fir (*Abies concolor*), Englemann spruce (*Picea englemannia*), limber pine (*Pinus flexilus*), and bristlecone pine (*Pinus aristata*) are present. This type also supports an understory, primarily Arizona fescue, shrubs, and forbs, which occur either singly or in combinations. This type accounts for 9.2 percent (47,683 acres) of the vegetation in the resource area. The conifer type is generally in fair (39 percent) to good (55 percent) condition.

Sagebrush

Sagebrush represents a small percentage of the total vegetation within the San Luis Resource Area (3.1 percent, or 15,740 acres). Normally found at higher elevations, the predominant species are big sagebrush (*Artemisia tridentata*) and rabbitbrush. The sagebrush type is in poor (67 percent) to fair (33 percent) condition. The lower areas near water are in the poorest condition, while higher areas away from water are in fair to good condition.

Greasewood

The greasewood type constitutes 3.1 percent (15,740 acres) of the resource area. It is located on areas in which the concentration of salts in the soils is high due to poor drainage. Small amounts of saltbush and rabbitbrush are sometimes intermingled with the greasewood (Sarcobatus vermiculatus) and sometimes with a poor to fair understory of saltgrass (Distichlis stricta). Poor (51 percent) to fair (49 percent) is the condition of the greasewood type in the resource area. The pH generally ranges between 8 and 10 for the soils in which the greasewood type grows. The vigor of the most desirable forage species in this type is low because of heavy use.

Annuals

The annual type is scattered throughout the resource area in small patches, representing 1.4 percent (7,411 acres) of the total vegetation cover. Predominant species in this type are Russian thistle (Salsola kali-var tenuifola) and stickleaf (Lappula spp.). This type may also include perennials such as scarlet globemallow (Sphaeralcea coccinea). This type is located on lowland areas and usually indicates past grazing abuse. Productivity is low and condition is poor (65 percent) to fair (35 percent) because of heavy overuse.

Winterfat

Only 0.7 percent (3,471 acres) of the resource area is covered by the winterfat type (Cenatodes lanata). It is found at lower elevations with an intermingling of snakeweed and rabbitbrush; and it has a poor to fair grass understory, containing blue grama, western wheatgrass, and Indian ricegrass. Winterfat is in poor to fair condition, with its soils being generally high in pH, ranging between 8 and 10. The vigor of the most desirable forage species in this type is low because of heavy use. Condition is poor (40 percent) to fair (60 percent).

Mountain Shrub

Representing only 0.7 percent (3,471 acres) of the vegetation, the mountain-shrub type includes untimbered lands where shrubs other than sagebrush and rabbitbrush predominate. The type occurs on the lower mountain slopes and foothills in the northeast portion of the resource area in the transition zone between conifer and half shrubs. Predominant species of this type include skunkbush (Rhus trilobata), mountain mahogany (Cercocarpu montanus), oak brush (Quercus gambelii), ribes (Ribes spp.), and snowberry (Symphoricarpus spp.).

The mountain-shrub type is in fair (20 percent) to good (80 percent) condition. Reproduction of young plants of various age classes is present. Slight present use accounts for the present fair to good condition of this type.

Rocky, Waste, and Barren Vegetative Type

The rocky, waste, and barren vegetative type occurs in dry lake beds, steep-rocky areas, and any other area that is incapable of supporting vegetative cover. The acreage where this type occurs represents only 0.5 percent (2,629 acres) of the resource area.

Saltbush

Saltbush constitutes 0.4 percent (2,054 acres) of the vegetative types in the resource area and is commonly found in scattered patches within winterfat and half-shrub types at the lower elevations. Species present include blue grama, Indian ricegrass, four-wing saltbush (Atriplex canescens), and winterfat.

The saltbush type is in poor (44 percent) to fair (56 percent) condition. Soils where it grows are generally high in pH, ranging between 8 and 10. Heavy use has made the vigor of the most desirable forage low.

Broadleaf

The broadleaf type is dominated by aspen (Populus tremuloides). It is found in isolated stands at higher elevations with the conifer type. The broadleaf type accounts for 0.3 percent (1,643 acres) of the resource area. This type usually has an understory of Englemann spruce or white fir seedlings. The broadleaf type is generally in fair (30 percent) to good (70 percent) condition.

Meadow (wet)

The meadow (wet) type constitutes a very small acreage within the San Luis Resource Area (0.2 percent, or 1,150 acres). Dominant species are sedge (Carex spp.), desert saltgrass, rush (Juncus), alkali sacaton (Sporobolus airoides), and tufted hairgrass (Deschampsia caespitosa).

The present condition is difficult to assess because of the complex plant community. Production capability of these sites is very high. Some meadows show signs of deterioration, but in general they are very durable and seem to persist regardless of the heavy grazing use. The wet-meadow type is classified in fair to good condition because of its resistance to erosion and the presence of desirable species.

Aquatic and riparian vegetation is discussed in a later section, "Aquatic and Riparian Communities."

Variations in Vegetative Types

A great deal of the variation in the vegetative types found within the resource area is based on elevation differences and exposure. Most of the conifer types are located at 8,500 feet elevation and higher, with the largest acreages occurring on the northern exposures. Most southern exposures are composed largely of pinyon-juniper and grassland communities. It is possible to find conifer types on northern exposures at elevations lower than where pinyon-juniper occurs. For the most part the grassland types are located just below and intermingled with the pinyon-juniper and conifer types. At higher elevations the grassland type is usually found on the southern exposures, and at medium elevations it occurs on all exposures. The winterfat and half-shrub types are found in the lower elevations of the unit, with the winterfat types usually located in the swales or bottoms and the half-shrub communities on the ridges and slopes.

Relationship to Soil Types

For a discussion of soil types, including productivity, see the preceding section on soils and table II-11 (p.II-26).

Poisonous and Noxious Plants

Poisonous and noxious plants are not a major problem, but some are scattered throughout the resource area. Water hemlock, arrowgrass, and horsetail are poisonous plants found in wet areas. These plants are quite prevalent and do cause some livestock losses. Areas where these occur are located mostly on private land, along streams and in meadows.

Greasewood grows in salt flats and has a potential for poisoning sheep, but losses attributed to this plant have not been confirmed. The foothills is an area where various poisonous plants grow: pink, low larkspur, horsebrush, whorled milkweed, Canada thistle, lupine, loco, oak brush, and henbane. Poisonous plants occurring at higher elevations include fall larkspur, monkshood, and chokecherry.

Threatened or Endangered Species

No specimens of the species contained in the list of endangered and threatened plant species of Colorado (Federal Register, Vol. 40, No. 127, p. 27846) have been found on NRL in the San Luis Resource Area. Only one species (Rorippa coloradensis) is listed as being in the vicinity; and the only known specimen was collected over 100 years ago, presumably in Alamosa County (Weber 1975).

Ecologically Unique Areas

Ecologically unique areas are limited to untouched bristlecone pine areas located in the Sangre de Cristo Range. These areas are situated on steep rocky slopes at high elevations.

Vegetative Condition

Range condition--good, fair, and poor--is used to describe the condition of the various vegetative types in the resource area. The following information describes the categories of range condition.

1. Good Condition: Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species. Erosion condition class is slight to stable.
2. Fair Condition: Composition is 15 to 39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Erosion condition class is less than critical. Also, ecosystems where 60 percent or more of intermediate species and less than 5 percent desirable species are present will be rated fair condition when the erosion condition class is moderate to stable.
3. Poor Condition: Composition is less than 15 percent desirable and intermediate species. Erosion condition class is critical to severe. (It should be noted that if the erosion condition class is severe to critical, the site is rated in poor condition regardless of the plant composition.)

Refer to figure II-14 for vegetative condition in the San Luis Resource Area. Refer to table II-19 (pp.II-75 f.) for vegetative condition classes by management unit.

Erosion condition classes (see table I-4, pp.I-24 f.) for description) and the classification of plant species as desirable, intermediate, and least desirable were used to determine range condition. The following criteria were used in the plant classification process:

1. Desirable plants are those which are palatable, productive, and nutritious forage species, are often dominant under climax or near climax conditions, are long-lived, and have extensive root systems to aid in protecting the watershed against erosion. This category includes the important key forage species (grasses, forbs, browse, and shrubs) which are to be maintained or increased by intensive livestock management.
2. Intermediate plants are of secondary importance in the climax

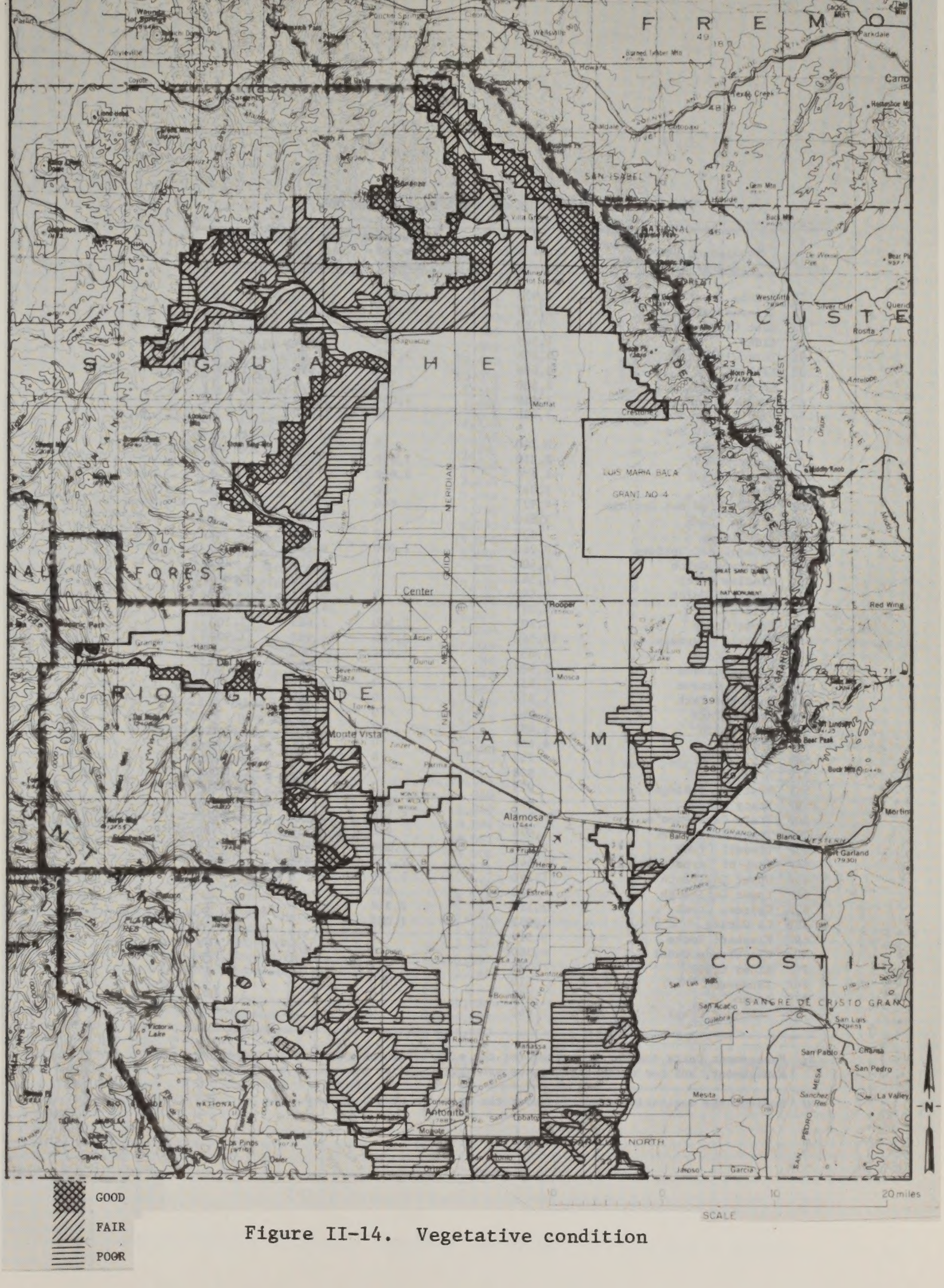


Figure II-14. Vegetative condition

TABLE II-19. VEGETATIVE CONDITION CLASSES FOR AMPs

Management Unit (AMPs) a/		Total Area (Acres)	Vegetative Condition Classes		
			Good b/ (Acres)	Fair b/ (Acres)	Poor b/ (Acres)
1P	Poncha Pass West	1,925	1,875	50	0
2E	Arizona-Colorado	12,173	6,870	5,303	0
4P	West Clover Creek	160	0	160	0
7P	Alder	1,349	749	600	0
9E	Turquoise Gulch	3,806	3,746	60	0
10E	Kelly Creek	6,699	900	4,699	1,100
11P	Kerber Creek	4,500	4,500	0	0
14E	Noland Gulch	7,650	4,050	3,600	0
15P	Nye	1,460	30	1,430	0
16P	East & West San Luis Creek	2,740	0	2,740	0
22P	Piney Creek	2,510	1,910	600	0
23P	Steel Canyon	4,472	3,822	650	0
24P	Mirage	2,395	80	2,315	0
25E	Valley View Hot Springs	4,927	640	4,287	0
28P	Cotton Creek	3,880	0	3,880	0
31P	Hutchinson	835	0	835	0
34P	Mineral Hot Springs	10,260	1,000	9,260	0
36P	McIntyre Gulch	4,602	0	4,402	200
39P	Findley Gulch	11,345	0	5,300	6,045
41P	Laughlin Gulch	6,643	0	6,443	200
42P	Poison Gulch	14,357	0	14,357	0
45P	Cross Creek	6,305	2,500	2,605	1,200
46P	Trickle Mountain	19,562	2,700	14,962	1,900
47P	Sheep Creek	2,031	1,031	1,000	0
48P	Taylor Canyon	2,902	0	200	2,702
50P	Rabbit Canyon	3,835	0	3,335	500
51E	Saguache Park	1,920	0	1,000	920
52P	Hat Springs	4,564	0	4,564	0
53P	Robb Ranch	1,488	0	1,488	0
55P	Mill Hill	4,167	0	4,107	60
56P	Higgins Spring	753	0	300	453
57P	Mitchell	938	0	40	898
58P	West Tracy Ridge	925	0	0	925
59P	Tracy Ridge	893	893	0	0
60P	Tracy Cattlemen's	27,749	5,140	15,709	6,900
61P	Tracy Individual	1,676	960	716	0
63P	Biedell Creek	2,462	1,500	962	0
64P	East of Carnero Creek	11,849	2,700	6,649	2,500
65P	Upper Coolbroth	1,780	1,780	0	0
66P	Lower Coolbroth	605	605	0	0
67P	Carnero Creek	2,318	2,318	0	0
68P	La Garita	1,082	1,082	0	0
69P	Elephant Rocks	3,517	0	3,517	0
70P	Rio Grande Canal	4,360	0	4,360	0
73P	Alder Creek	275	275	0	0
76P	Sanderson	510	510	0	0
77P	Bowen	488	0	0	488
78P	Schrader Creek	640	0	0	640

a/ Management Units that are proposed for the elimination of grazing, custodial management, and for unallotted status are aggregated at the end of the table.

b/ Depicts the vegetative condition over the area (in acres) of each AMP.

TABLE II-19. VEGETATIVE CONDITION CLASSES FOR AMPs (cont.)

Management Unit (AMPs) a/	Total Area (Acres)	Vegetative Condition Classes Good b/ (Acres)	Fair b/ (Acres)	Poor b/ (Acres)
79P Branch	2,457	2,457	0	0
80P Pup Peak	5,002	0	0	5,002
81P Limekiln	5,050	0	0	5,050
82P Nicomodes	3,080	0	560	2,520
83P Raton Creek	3,940	0	1,200	2,740
84P Rock Creek	12,680	840	9,840	2,000
85P McMahon	15,016	1,500	2,560	10,956
86P Greenie Mountain	8,114	400	4,000	3,714
87P Gato-Hutchinson	1,960	0	520	1,440
88P Triangle	3,715	0	1,840	1,875
89P Alamosa River	760	0	0	760
93P Posito Creek	4,991	0	1,400	3,591
94P Jadero Flat	5,200	0	2,900	2,300
95P Poso Creek	2,240	0	100	2,140
96P Capulin	5,589	0	3,989	1,600
97P Romero Canyon	1,730	0	1,730	0
98P Ra Jadero Canyon	6,730	0	5,430	1,300
99P Cinder Pits	15,370	0	3,000	12,370
100E Ciscom Flat	3,680	0	0	3,680
102P La Jara Creek	820	0	820	0
106P Little Mogotes	13,510	0	6,110	7,400
107P Grande	3,950	0	2,850	1,100
108P Mogote Flat	1,977	0	1,977	0
109P Poso	5,240	0	800	4,440
110P Los Mogotes	7,514	0	640	6,874
111P Big Horn Creek	760	0	0	760
112P Railroad	3,741	0	0	3,741
113P Llano	5,261	0	0	5,261
115P Alta Lake	11,446	0	7,946	3,500
116E Twin Lakes	8,153	0	7,253	900
117P River	2,324	0	0	2,324
119P South Valley	1,800	0	1,800	0
120P Pinon	7,210	0	4,650	2,560
121E Kiowa Hills	4,302	0	300	4,002
122P Braiden	960	0	0	960
123P Eight Mile	5,640	0	0	5,640
124P Pinon Hills	9,274	0	0	9,274
125P Rio Grande Common	18,611	0	2,600	16,011
126P La Sauses	3,200	0	0	3,200
129P Rio Grande	2,975	0	640	2,335
132P Four Mile	320	0	0	320
133P Tobin Creek	6,126	0	1,600	4,526
134P Foothills	4,700	0	1,440	3,260
137P Blanca	5,220	0	0	5,220
138P Dry Lakes	5,836	0	0	5,836
141P Zapata Falls	5,991	0	4,351	1,640
159E Klondyke	1,169	0	1,169	0
Eliminated	5,930	1,080	1,930	2,920
Custodial	16,625	1,000	15,625	0
Unallotted	19,900	10,000	9,900	0
TOTAL	516,371	71,443	249,955	194,973

and are usually associated with, or indicators of, ecological successional stages. They replace the desirables as condition deteriorates and replace the least desirables as condition improves. They may be less palatable to grazing animals or be more resistant to grazing use.

3. Least desirable plants include those that are definitely the poorer species in an ecosystem and consist principally of annuals, invaders, noxious, and low-value forage plants. All annuals and poisonous species are included in this classification except in the strictly mediterranean type (California), where annuals consistently provide the bulk of the forage species.

Wildlife

Habitat

Odum (1959) loosely defines a biotic community as "any assemblage of populations living in a prescribed area or physical habitat." In normal usage, however, biotic communities are usually named and delineated according to the major plant communities or habitat types. Mobile animals such as large herbivores, predators, and birds often range from one plant community to another. Habitat types are used in this section to help describe the wildlife populations and their problems related to livestock grazing. In reality, however, all of the living components are involved in a complex ecosystem, and impacts on one component would eventually produce impacts throughout the entire ecosystem.

NRL in the San Luis Resource Area provides eight important habitat types for terrestrial wild animals. Ten broad vegetative types combine to form six important habitat types, covering over 97 percent of the surface acreage of the resource area. These habitat types include the saltbush and greasewood type, half-shrub and winterfat type, grassland type, pinyon-juniper woodland type, mountain shrub and sagebrush type, and coniferous and broadleaf forest type. Two types--wetlands (marsh, riparian, and wet meadows) and rocky cliffs and canyons--are extremely limited (0.7 percent) in surface acreage, but each has special significance as habitat. The remaining vegetative type--annuals--has little importance as wildlife habitat. The preceding section on vegetation gives details on the vegetative composition of each type and includes a map (figure II-13, p.II-65) showing the distribution and a table

(II-18, p.II-64) showing the acreages of the vegetative types in the resource area. The shrub overstory of the saltbush and greasewood type provides excellent habitat for magpies, mourning doves, jackrabbits, cottontails, many small mammals, and shrub nesting nongame birds. The high density of rabbits and other small mammals and birds also attracts a relatively high number of predators, such as the coyote and wintering birds of prey.

Antelope use the half-shrub and winterfat habitat type extensively, especially for winter range, but the fauna has relatively little diversity. Ground nesting birds such as the horned lark and western meadowlark are common, as are fossorial (burrowing) small mammals. The fauna which characterizes the grassland type is similar to that of the half-shrub and winterfat type. Antelope also use the grassland type extensively, often for summer and spring-fall range, and prairie dogs and horned larks are common.

The mountain-shrub and sagebrush type has special importance because of the winter forage and cover its browse plants provide for big-game animals, especially deer and elk. The mountain-shrub and sagebrush type is also especially important for shrub nesting birds.

The pinyon-juniper and woodland type and its browse understory are extremely important for browsing big-game animals such as deer and elk since they provide much of the forage and cover for their winter stress period. This type is also important for shrub nesting birds, hole nesting birds, and woodland mammals such as the porcupine and bobcat.

The coniferous and broadleaf forest type is important summer range for deer and elk, nesting habitat for band-tailed pigeons, and yearlong range for blue grouse. This type also provides important habitat for a wide variety of forest animals such as snowshoe hares, porcupines, black bears, cavity-dwelling mammals, accipter hawks, chickadees, woodpeckers, and jays.

Wetland habitat is extremely limited in the resource area, but it provides crucial habitat for the largest variety of wild animals, including most of those characteristic of other habitat types. The wetland type is a grouping of marshland, riparian (stream side) woodlands, and the wet meadows that occur with each. Presently, there are about 400 acres of marsh, 47 miles of permanent stream with adjacent riparian woodland, and 1,100 acres of wet meadow (mostly associated with the marsh and riparian woodlands) on NRL in the San Luis Resource Area. Animals that depend on this type include waterfowl, shorebirds, and wading birds plus a large variety of songbirds, small mammals, and furbearers.

The final habitat type, rocky cliffs and canyons, is scattered throughout the resource area, but it occupies little horizontal surface acreage. About 2,500 acres have been identified as rocky waste in the vegetative typing process. This type is important as nesting habitat for birds-of-prey such as the golden eagle and the prairie falcon. It is also important to bighorn sheep, since they depend on steep rocky slopes for escape cover.

Animals

A detailed species list of the terrestrial fauna of the San Luis Resource Area appears in Appendix 3. The appendix list contains all vertebrates that are known to be present in the resource area, plus those invertebrates (or groups) that are considered economically important or significant to livestock grazing. Habitat preference, relative abundance, and seasonal occurrence (for birds only) are indicated according to the best information available.

Considerable information is available on the habitat requirements of the game animals--especially the large herbivorous species such as deer, elk, antelope, and bighorn sheep--and those species considered endangered. Those game species on which grazing is considered to have a significant impact are discussed in detail in the following narrative. Little information is available on the remaining animals; therefore, they will be summarized according to the typical animal-habitat associations within each major habitat type for the vertebrates. Even this basic information is generally lacking for the invertebrates. The following discussion is separated according to the major taxonomic groups.

Soil Invertebrates

The soil fauna's primary function in any ecosystem is to decompose dead organic matter. Paris (1969) concludes that decomposers are essential for maintaining equilibrium in the energy flow and nutrient cycling of the grassland ecosystem of North America. He summarizes the functions of the major groups of soil animals as shown in table II-20.

The bacteria and fungi (soil flora) are the primary organisms that carry on the decomposition of organic matter to basic minerals. One of the main functions of soil animals is to mechanically break down the

TABLE II-20. COMMUNITY FUNCTIONS OF SOIL ANIMALS

Taxonomic Group	Food	Community Function
Earthworms	Litter, mineral soil	Primarily decompose soil by comminuting litter, mixing soil and litter, producing crumb structure in soil
Mollusks	Green and dead forbs, fungi	Primarily decompose plants
Isopods	Litter	Comminute litter and some plants
Diplopods	Litter	Primarily decompose soil by comminuting litter
Dipterans	Litter, carrion	Primarily decompose carrion, also comminute litter
Coleopterans	Dung, carrion	Primarily decompose dung and carrion
Nematodes	Protoplasm of fungi, bacteria, roots, small animals	Dissipate energy at a high rate, turn over nitrogen; influence on microbial populations uncertain
Enchytraeids	Fungi, bacteria	Function not well-known, but important to energy flow and probably to nutrient cycling
Collembolans	Fungi, bacteria, algae, fluids of plants and small animals	Comminute plant remains, disperse fungal spores; effects on microbial populations uncertain
Mites	Fungi, bacteria, algae, small animals	Disperse fungal spores, comminute litter; influence on fungal populations uncertain
Ants	Omnivorous	Consume seeds; probably important to energy flow and may influence aphid populations; mounds and tunnels affect soil structure

litter into forms readily decomposed by the microbial flora (Odum 1959).

The mites (Acarina) and springtails (Collembola) are normally the most abundant organisms in the soil fauna, but macroscopic organisms such as earthworms and insects represent a much larger "biomass," that is, biological weight (Odum 1959). The macroscopic soil animals are very important in mixing the soil and maintaining an absorbant consistency.

Other Invertebrates

Other invertebrates considered important to the economy or to livestock grazing are also listed in the species checklist in Appendix 3. The bighorn sheep lungworm (Protostrongylus stilesi) and the land snails (mostly Vallonia pulchalla and Papilla blandi), which serve as its alternate host, are especially significant to the population dynamics of bighorn sheep. Large-scale mortality in bighorn herds, attributed to the lungworms-pneumonia complex, is considered one of the bighorn's major limiting factors (Bear and Jones 1973).

Other invertebrates listed in Appendix 3 include ticks, mosquitoes, and flies, which are biting pests and disease vectors for both humans and wildlife, especially mammals (Hewitt et al. 1974). There are also several groups of insects that have been documented to be pest consumers of range forage plants (Hewitt et al. 1974). These pests, however, are not believed to do significant damage on a regular basis to range forage plants in the resource area (Nelson 1975).

The U.S. Park Service has identified a species of tiger beetle (Cincindela fermosa) which is believed to be endemic to the sand dune habitat in and adjacent to the Great Sand Dunes National Monument. This beetle species is important primarily as a subject of scientific study.

Invertebrates are also a primary source of food for many higher forms of animals, e.g., fish (trout and sunfish), amphibians (frogs and toads), reptiles (snakes and lizards), birds (shorebirds, swallows, and flycatchers), and mammals (shrews and bats).

Reptiles

The reptilian fauna of the resource area is extremely limited, mostly because of the severe climatic conditions (extreme cold) which exist (Keen, undated). The reptiles known to occur in the valley are listed in Appendix 3. The garter snakes are common around permanent water. The western rattlesnake is present in the rocky foothills in low numbers, but generally it is not a problem to humans or animals.

Birds

Waterfowl. The San Luis Valley has been described as the southernmost major waterfowl production area in the central flyway. Important nesting species include the Canadian goose, mallard, gadwall, pintail, green-winged teal, blue-winged teal, cinnamon teal, and redhead.

The total available waterfowl nesting habitat has decreased considerably in the San Luis Valley since 1900 because of extensive agricultural development and a decrease in the level of the water table.

However, development of the Monte Vista and Alamosa National Wildlife refuges and several other areas designed for waterfowl production has replaced much of the lost habitat in the valley. The Blanca Wildlife Habitat Area, under development by the BLM northeast of Alamosa, and the Colorado Division of Wildlife's Rio Grande Management Area are among the other areas designed and managed for waterfowl production.

The only significant waterfowl production area over which BLM has the primary management control is the Blanca Wildlife Habitat Area (Blanca AMP--130P). An environmental analysis has been completed and lands have been withdrawn in order to manage this area primarily for wildlife, especially for the production of waterfowl. Approximately 350 acres of wetlands are now available for waterfowl use at this area (see figure II-15).

Waterfowl populations have increased to about 1,200 during the peak of 1975 spring migration; and an estimated 200 breeding pairs produced about 50 broods, or 250 ducklings, during 1975. Production also included four goose broods with a total of nineteen goslings.

The waterfowl habitat management techniques being used at the Blanca Wildlife Habitat Area are primarily related to the production of desirable vegetation for waterfowl nesting cover and food. Livestock grazing is thought to be compatible with the wildlife objectives if it is designed to periodically set back plant succession and thereby increase plant vigor and density. Detailed information on wildlife populations and management objectives is available in the Blanca Wildlife Habitat Management Plan (file code 6620) in the San Luis Resource Area office in Alamosa, Colorado.

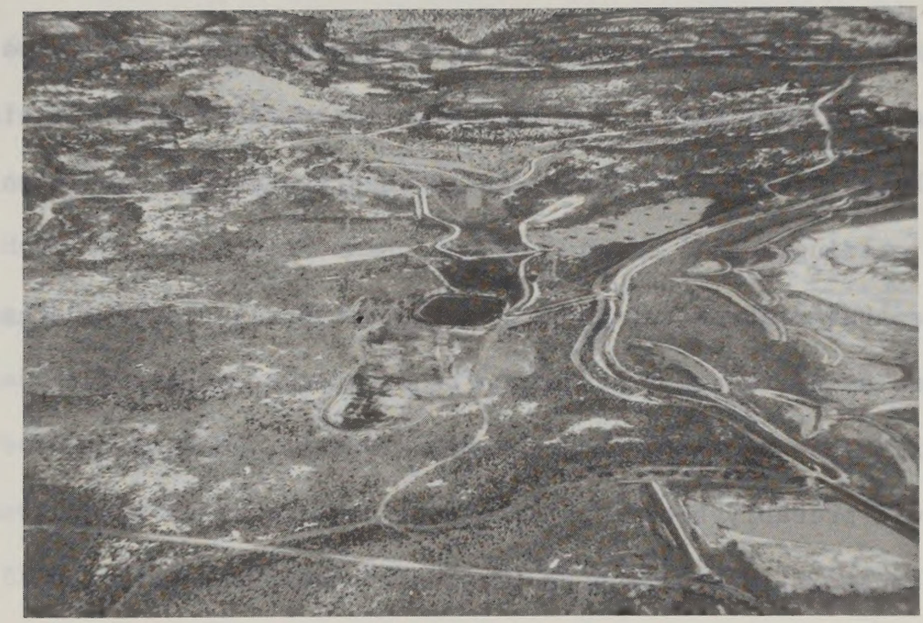


Figure II-15. Part of waterfowl habitat being developed at the Blanca Wildlife Habitat Area

Other areas providing some waterfowl nesting habitat on land administered by the Bureau include a small portion of the Mishak Lakes; the west bank of the Rio Grande in the lower Rio Grande Canyon; portions of La Jara Creek, Sheep Creek, and San Luis Creek; several small reservoirs with permanent water; and several small ponds caused by uncontrolled artesian wells in the Dry Lakes area.

The Mishak Lakes are being considered for the development of a National Wildlife Refuge, and the NRL in this vicinity would probably be transferred to the U.S. Fish and Wildlife Service if development is undertaken. There is presently no yearlong water supply or water control on these lakes, and many duck broods have been stranded when lakes dry up prematurely in dry years. Population estimates are not available for the Mishak Lakes area. The habitat is in relatively poor condition because of past grazing.

A limited amount of duck and goose nesting presently occurs in the Rio Grande Canyon along the southern end of the resource area. When projected expansion of the resident goose flock occurs, however, the river bottom would probably become an important nesting area. Similar habitat in the center of the valley is presently used extensively by geese for nesting. That portion of the Rio Grande bottom south of the Lobato Bridge is mostly in excellent condition, since rimrock prevents livestock access into the canyon. The portion north of the Lobato Bridge, however, has been grazed heavily in past years; consequently, there is little cover available.

Waterfowl use of the other areas mentioned is probably insignificant to the valley-wide population. The cover along La Jara, Sheep, and San Luis creeks is in relatively good condition, but the banks of the reservoirs and well ponds are all grazed heavily each year.

Upland Game Birds. Band-tailed pigeons are summer residents of the resource area. These birds are present in scattered flocks throughout the cultivated farmland in the valley during the late spring and early fall, but the birds are restricted to their nesting areas and nearby feeding areas during most of the summer. Their nesting areas are primarily within the coniferous-forest type. Known nesting areas are shown in figure II-16.

Nesting pigeons flock together to make daily feeding flights into cultivated farmland near the nesting areas. Wild fruit and mast are also important as band-tailed pigeon food.

Mourning doves are common throughout the planning area from late spring to early fall. Their primary habitat requirements are readily available throughout the area and no important problems or conflicts have been identified. Harvest data are presented in table II-21 for the entire San Luis Valley.

Blue grouse are present in small numbers in the limited coniferous forest available throughout the resource area. The nesting habitat of blue grouse is usually moist stream bottoms; overgrazing these areas would detract from the quality of their nesting cover. Blue grouse food includes mostly insects in the summer and conifer needles in the winter. Available harvest data are shown in table II-21 for the entire San Luis Valley to reflect hunting mortality, but the harvest attributable to BLM-administered land is probably insignificant.

Sage grouse were introduced into the area of Round Hill and Swidinski Creek near Poncha Pass in the early 1970s (figure II-16), but they were not observed again for several years. Two broods, however, were observed during the summer of 1974, and the introduction is now thought to be successful. Sage grouse depend on sagebrush yearlong for food

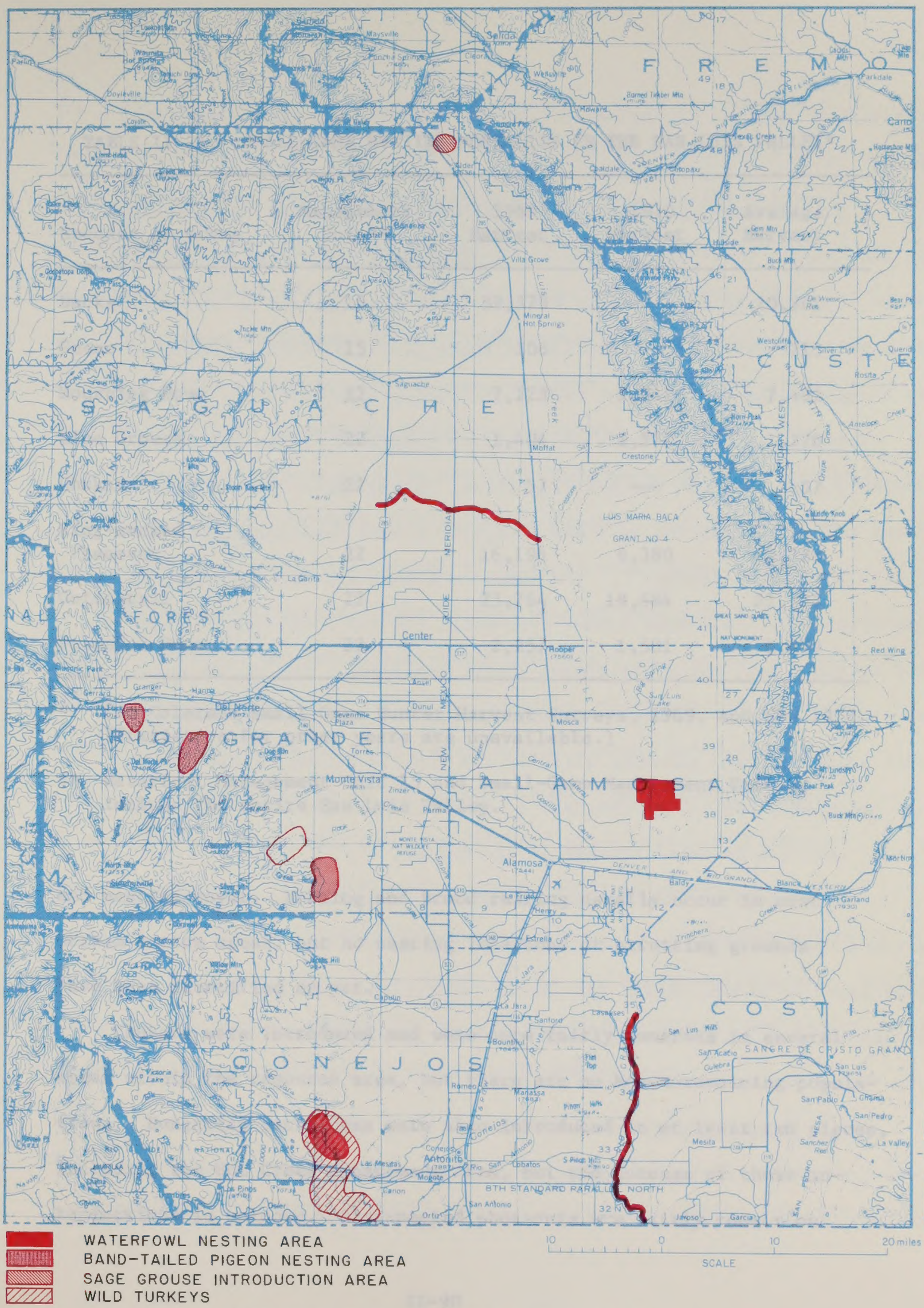


Figure II-16. Game bird distribution in the San Luis Resource Area

TABLE II-21. SMALL-GAME HUNTING MORTALITY IN THE SAN LUIS VALLEY*

Species or Group	Management Unit**	1969 Harvest	1970 Harvest	Average Harvest
Ducks	15	32,373		20,301
Geese	15	106		213
Mourning Dove	22	7,123	7,841	7,482
Blue Grouse	22	1,404	1,237	1,320
Chukar	22	57	---	57
Ring-necked Pheasant	22	16,196	9,380	12,788
Cottontail	22	23,764	19,684	21,724
Snowshoe Hare	22	2,257	1,501	1,879

* See Colorado Small Game Hunter Harvest Surveys, 1969, and CDW 1970. (Statistics for other years are unavailable.)

** Waterfowl Management Unit 15 and Small-Game Management Unit 22 include the entire San Luis Valley.

and nesting cover. Nesting and brood rearing usually occur in most stream bottom areas, but no nesting locations or strutting grounds have been identified as yet.

Chukars were introduced and were once fairly numerous in several areas within the resource area, but there are no known remaining populations. Hungarian partridges were also introduced in at least two places, including the Hot Creek Management Area, but the success of these introductions is unknown. Ring-necked pheasants are fairly common on cultivated farmland in the valley, but they seldom use BLM-administered land.

A small remnant population of wild turkeys is thought to be present in the Conejos River drainage in the southwestern portion of the valley. These birds possibly use NRL in the Fox Creek drainage and in the Ortiz Unit near the New Mexico state line (figure II-16, p.II-89). Poaching is thought to be an important factor inhibiting this flock.

Raptors. Raptors, which are yearlong residents of the San Luis Resource Area, include the prairie falcon, golden eagle, red-tailed hawk, marsh hawk, great-horned owl, and peregrine falcon (see subsequent section, "Endangered Species"). The Swainson's hawk and American kestrel (sparrow hawk) are common summer residents, and the rough-legged hawk and northern bald eagle are common winter residents. The cliffs and precipitous rock formations scattered throughout the resource area are used as nesting and perching sites by the prairie falcon, golden eagle, and red-tailed hawk. The Swainson's hawk, American kestrel, and great-horned owl nest in trees throughout the valley.

Raptors have an indirect relationship to range forage and livestock grazing because of their position at the top of the food chain and their dependence on animal matter for food. Vegetative condition does have an indirect effect on raptors because their prey species depend on vegetation for food and cover.

Other Nongame Birds. A total list of birds known to inhabit the resource area is contained in Appendix 3, but information is insufficient on most to determine population status or specific habitat requirements.

The following nongame birds are typical inhabitants of the important biotic communities (vegetative types) in the San Luis Resource Area (Ryder 1965). The marsh and riparian woodland types provide the preferred habitat for the largest variety and numbers of nongame birds. Red-winged and yellow-headed blackbirds; large wading birds such as sandhill cranes, snowy egrets, and black-crowned night herons; and shorebirds such as the American avocet, killdeer, and Wilson's phalarope are characteristic of marshes, ponds, and streams. The endangered whooping crane is also a rare migrant (see "Endangered Species" section). The yellow warbler, Northern oriole, common flicker, western kingbird, and black-billed magpie are typical of riparian woodlands.

The loggerhead shrike, Brewer's sparrow, and sage thrasher are characteristic of the salt-desert-shrub community; and the horned lark and western meadowlark are typical of both the half-shrub and grassland communities. The sage thrasher, green-tailed towhee, and rufous-sided towhee are characteristic of the mountain-shrub community; and the pinyon jay, scrub jay, and mountain bluebird are typical of pinyon-juniper woodlands. The dark-eyed junco, mountain chickadee, pygmy nuthatch, and Stellar's jay are characteristic of the coniferous-forest type; and the common nighthawk, common raven, and turkey vulture are common in all habitat types. The rock wren, prairie falcon, and golden eagle are typical residents of rocky cliffs and canyons.

Mammals

Mule Deer. Presently, deer herds are below the carrying capacity of their range in most of the San Luis Resource Area. Localized exceptions are noted in subsequent paragraphs describing seasonal use and crucial areas. As in most of the mountainous parts of Colorado, deer herds in the San Luis Valley underwent a buildup during the mid-1900s, but since then a steady loss of habitat caused by human encroachment and increasing mortality due partially to illegal harvest has reduced the herds to their present size.

Predation is thought to be unimportant in comparison to other direct mortality factors in healthy deer populations that are near the carrying capacity of their range. If herds, however, are below their optimum numbers for various reasons, predation is believed to be a significant source of mortality which, in combination with other mortality factors, could prevent the herds from increasing to optimum numbers. Coyotes and mountain lions are thought to be the primary predators contributing to less than optimum deer herds in the resource area, but this cannot be documented.

Gross population estimates for each of the game management units in the San Luis Resource Area are presented in table II-22. The maximum winter deer population using NRL in the resource area is presently estimated to be about 4,500. The deer herds are continuing in a slight downward trend or are stable at best, despite efforts in recent years to increase them with restricted hunting seasons.

Habitat inventory data show that deer habitat in the resource area is in generally good condition with a trend toward further improvement and that forage is available to increase the herd. A few areas, however,

TABLE II-22. MULE DEER POPULATION STATUS IN THE SAN LUIS RESOURCE AREA

	Game Management Unit 1/					
	68	79	80	81	82	Total
Estimated total population	1,800	800	1,100	800	2,000	6,500
Estimated population, NRL*	1,250	350	800	600	1,500	4,500
Average legal harvest total	615	271	364	270	343	1,863
Percent harvest NRL**	40	25	33	33	50	37
Average legal harvest, NRL**	246	68	120	89	172	695

1/ Game management units are identified in figure II-17, p.II-97

* The maximum estimated population to use national resource lands at least part of each year

** The harvest attributed to habitat provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

are still overused by big game and livestock. Habitat data for the identified crucial ranges are shown in table II-23.

Hansen and Reid (1975) describe the food habits of mule deer and the dietary overlap between deer, elk, and cattle on habitat in southern Colorado similar to that available in the resource area. Their study (1975) shows that woody forage such as coniferous trees, shrubs, and half shrubs comprise nearly 90 percent of mule deer diets in all seasons except the summer when grasses comprise over 40 percent (see table II-24). Diet overlap between deer and elk is the greatest (23 to 48 percent) in the

TABLE II-23. HABITAT STATUS OF MULE DEER AND ELK CRUCIAL WINTER RANGES IN THE SAN LUIS RESOURCE AREA

Area	Deer-days use per acre	Elk-days use per acre	Aver.% Utili-zation	% Browse Unsatis-factory	% Browse Seedling & Young
GMU 79					
Alder Creek	10	7	64	0	22
Bear Creek	14	5	64	--	--
Aqua Ramon Mtn.	14	22	59	--	--
Embargo Creek	22	9	--	43	31
GMU 80					
Shaw Mesa	22	8	--	40	30
Willow Creek	12	4	50	--	--
Pinos Creek	6	3	15	--	--
Rock Creek	11	0	--	17	19
Greenie Mtn. NE	9	1	--	12	7
Greenie Mtn. Upper	15	26	--	22	15
Cat Creek	13	6	35	--	--
Chiquita Peak	15	3	--	0	31
GMU 81					
Ra Jadero Canyon	10	15	30	61	8
La Jara Creek	11	8	--	--	--
Leandro Canyon	22	7	--	26	39
Fox Creek	20	2	55	31	25
Bighorn Creek	25	8	60	3	40
GMU 82					
South Chaining	10	9	2	26	29
between chainings	28	14	40	39	30
North Chaining	16	19	35	58	8
Zapata Creek	22	0	35	10	35
No. Crestone Creek	40	0	44	--	--
Cherry Creek	39	1	65	--	--
Hot Spring Canyon	26	1	44	--	--
Orient Mine	30	2	41	--	--
Raspberry Creek	11	8	28	--	--
GMU 68					
Alder Creek	2	10	20	--	--
Turquoise Creek	20	3	33	--	--
Poison Gulch	10	1	16	--	--
Middle Creek	5	0	36	--	--
Ward Gulch	4	4	51	--	--
Mud Springs	8	1	30	--	--
Trickle Mtn.	10	5	27	13	7
Rabbit Canyon	8	5	35	--	--
Spring Gulch	16	8	57	--	--
No. Tracy Canyon	10	13	27	--	--

SOURCE: Intensive and extensive big-game utilization transects and browse condition transects

TABLE II-24. SUMMARY OF SEASONAL FOODS OF MULE DEER
(near Fort Garland, Colorado)

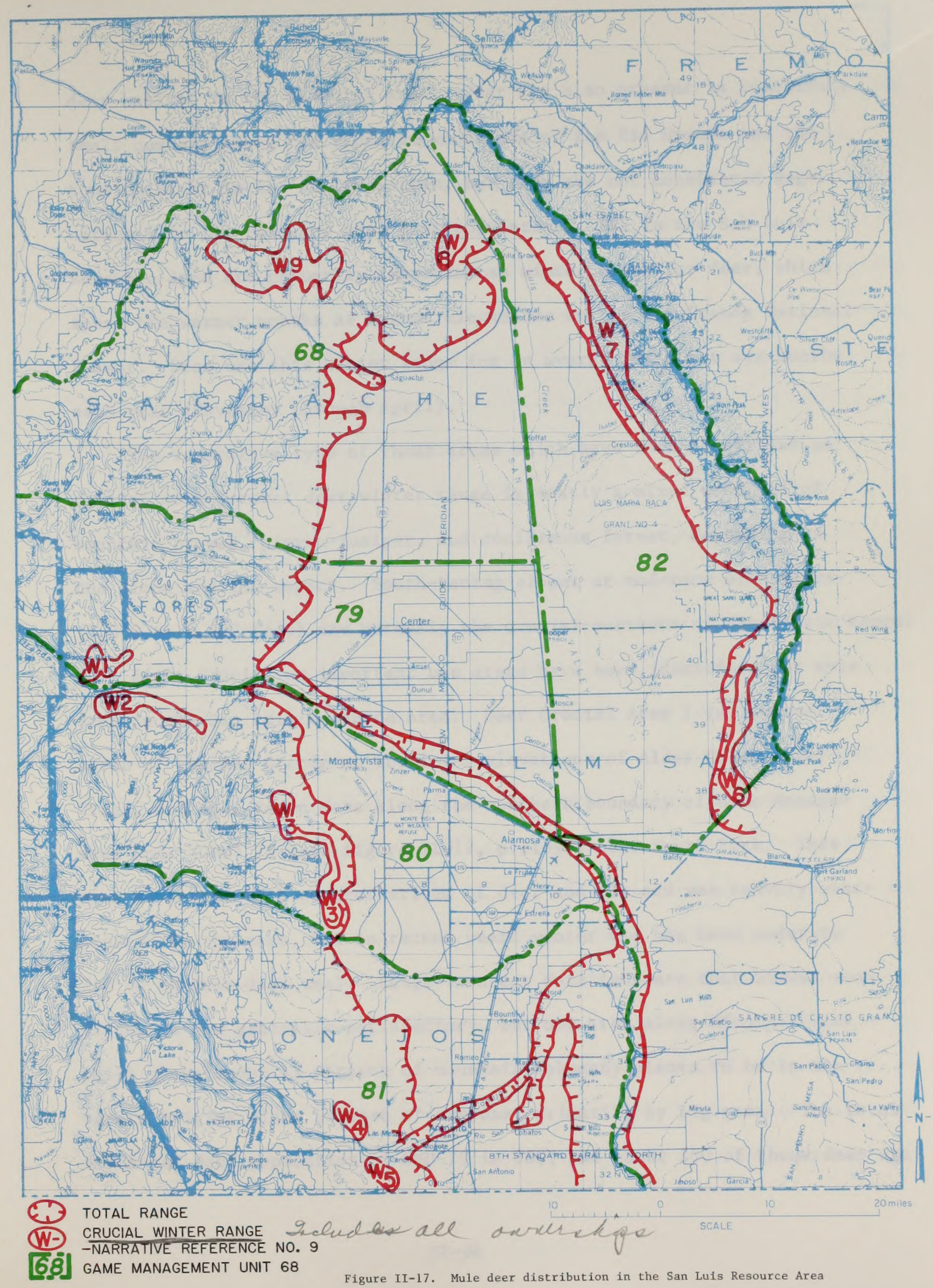
	Seasonal Diets (%)			
Class of Forage	Winter	Spring	Summer	Autumn
Tree	23	14	7	14
Shrub & half shrub	70	74	38	77
Forb	2	4	12	0
Grass	5	8	43	9
Total percent	100	100	100	100

SOURCE: Hansen and Reid 1975, p. 45.

summer months, when both animals eat a large proportion of grasses. Diet overlap between deer and cattle is also the greatest (40 percent) in the summer months because of a preference for grass by both. Sheep and deer dietary overlap is summarized by Stoddart and Rasmussen (1945) as being the greatest in the summer, with about a 50-percent yearlong overlap.

The browse species used by deer in the resource area are primarily mountain mahogany, little rabbitbrush, rubber rabbitbrush, four-winged saltbush, horsebrush, pinyon pine, juniper, and big sagebrush and Gambel oak where present. Currant, gooseberry, yucca, skunkbush, and snowberry are also used on a limited basis during severe winters.

Deer seasonal use ranges, crucial winter ranges, and game management units are shown in figure II-17. The foothills and the mountains of the San Juan and Sangre de Cristo ranges provide the primary mule



Includes all overlaps

Figure II-17. Mule deer distribution in the San Luis Resource Area

deer habitat in the planning area. Deer are also present in relatively small numbers along the riparian woodlands of the Rio Grande and the Conejos River in the valley bottom, but they are not considered significant to the resource area deer population. NRL in the San Luis Resource Area are primarily important as winter range for deer, which spend the warmer months at higher elevations on the Rio Grande National Forest. Deer use this winter range for an average of about six months each year (November through April).

The vegetative type of those areas which have been identified as crucial or important deer winter range is mostly a mixed woodland of mountain browse, pinyon-juniper, and coniferous forest, depending on the slope and the aspect. South-facing slopes at moderate elevations (8,000 to 9,000 feet) are normally the crucial portions of the winter range.

Eight crucial or important use areas have been identified for mule deer in the San Luis Resource Area. Deer Crucial Area 1 is located north of the Rio Grande at the lower elevations of Alder Creek, Bear Creek, and Aqua Ramon Mesa along the southern boundary of Game Management Unit (GMU) 79 (see figure II-17, p.II-97) near South Fork. This area supported high concentrations of deer and elk and was heavily overbrowsed in the past, but in recent years winter use has been moderate (10 to 20 deer-days use). Range transect data indicate that browse condition is now generally satisfactory, but one area along Embargo Creek still shows about 43 percent of mountain mahogany plants to be in the severe hedging class because of overuse, primarily by big game. The total estimated deer population of GMU 79 is 800, and about 350 of these deer use

NRL (table II-22, p.II-94).

Deer Crucial Area 2 is located south of the Rio Grande from about Willow Creek to Pinos Creek along the northern boundary of GMU 80 near South Fork. Winter use has ranged from about 10 to 25 deer-days use per acre in recent years, but some areas of concentration still show signs of past overuse. Range transect data from Shaw Mesa (table II-23, p.II-95) indicate that over 40 percent of the mountain mahogany and serviceberry plants are in unsatisfactory condition because of past overbrowsing by both deer and elk. The trend in browse condition is static or slightly improving.

Deer Crucial Area 3 is located southeast of Monte Vista in the Rock Creek, Dry Creek, and Raton Creek drainages and around Greenie Mountain and Chiquita Peak. Deer concentrations have been light to moderate (5 to 20 deer-days use per acre) during recent years from Rock Creek to Raton Creek, but this area probably supported the largest concentrations of deer in the resource area during the late 1950s. Range transect data (table II-23, p.II-95) indicate that between 15 and 20 percent of the browse plants have been severely hedged in Rock Creek, and this is believed to be due in part to winter sheep grazing.

Pellet group counts have ranged between 15 and 35 deer-days use per acre on the middle elevation slopes of Greenie Mountain in recent years, depending on the severity of the winter. The upper elevations of this crucial area are covered with dense stands of coniferous forest interspersed with small parks in the drainage bottoms. Game range transect data indicate that crown cover is about 60 percent and there is less than 10 percent first story vegetative ground cover. Browse consists mainly of scattered Rocky Mountain maple plants within the forested areas and moderately good stands of mountain mahogany in the parks and edges of the timber. Between 10 and 20 percent of the mountain mahogany plants are in unsatisfactory condition because of severe hedging by deer and elk (table II-23, p.II-95).

The Chiquita Peak area receives only light to moderate use during normal winters (10 to 20 deer-days use per acre), but it is considered crucial during severe winters. Range transect data indicate that browse condition is satisfactory and that there is adequate forage to support more deer. The estimated total deer population of GMU 80 is 1,100 and the population using NRL is about 800 (table II-22, p.II-94).

Deer Crucial Area 4 is located in the breaks between Fox Creek and the rimrock cliffs on the southwestern slopes of Los Mogotes Mountain. Winter concentrations have been moderately high in recent years (about 30 deer-days use per acre) and range transect data (table II-23, p.II-95) indicate that about one-third of the browse plants is in unsatisfactory condition because of past and present severe hedging. A moderate winter kill was also evident following the severe winter of 1972-73.

Deer Crucial Area 5 is located in the extreme southwestern portion of the resource area in the Bighorn Creek Drainage south of the Conejos River (figure II-18). Pellet group counts of 25 to 35 deer-days use per acre have been common on this range in recent years, but there has been little or no severe hedging (table II-23). The staple winter browse is probably provided by big sagebrush, which is present in this area.

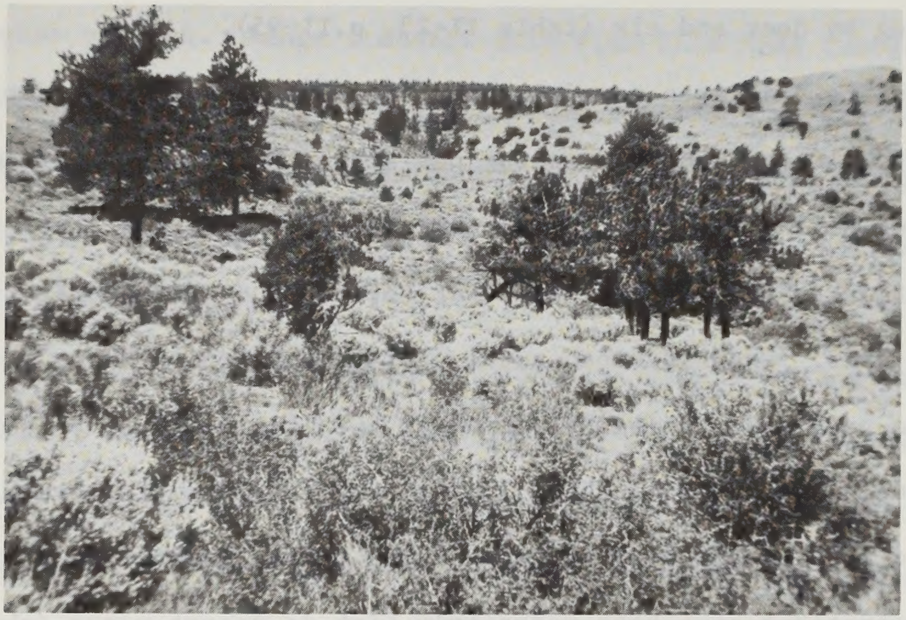


Figure II-18. Typical deer winter range in Deer Crucial Area 5 in the southwestern portion of the resource area. Note the big sagebrush, which is the staple winter food.

Big sagebrush is not found in many parts of the San Luis Valley, and those areas in the southern Conejos Planning Unit containing big sage could ultimately provide more winter deer forage.

There are several other important deer winter areas in the southern portion of the resource area that are not considered crucial at present population levels. These include Los Mogotes Peak, mid-La Jara Canyon, Leandro Canyon, upper Ra Jadero Canyon, and upper Poso Creek. Pellet group counts have ranged from about 5 to 20 deer-days use per acre in these areas in recent years.

A small resident deer herd estimated at 100 animals or less inhabits the Rio Grande Valley and canyon along the southeastern border of the resource area and the Pinon Hills and San Luis Hills, which border the river on the west from the New Mexico-Colorado state line to its confluence with the Conejos River. These deer are mostly yearlong residents, but some seasonal movement apparently occurs between the highest elevations of the hills and the river bottom. Range transects show that the major habitat components (food, water, cover, and isolation) are present in adequate quantities in this area to support a much larger deer herd in the winter, but inadequate summer range is probably limiting the herd. The succulent forage and free water provided by typical (higher elevation) deer summer ranges are available in only a limited strip along the Rio Grande.

The estimated total deer population of GMU 81 is about 800, with about 600 estimated to use NRL (table II-22, p.II-94).

Deer Crucial Area 6 (figure II-19) is located on the lower slope of the southern Sangre de Cristo Mountains from about Zapata Creek to the Tobin Creek drainage (figure II-17, p.II-97). This crucial area is primarily within a broad bank of pinyon-juniper woodland, but it also contains two tracts totaling about 1,540 acres in which the pinyon-juniper

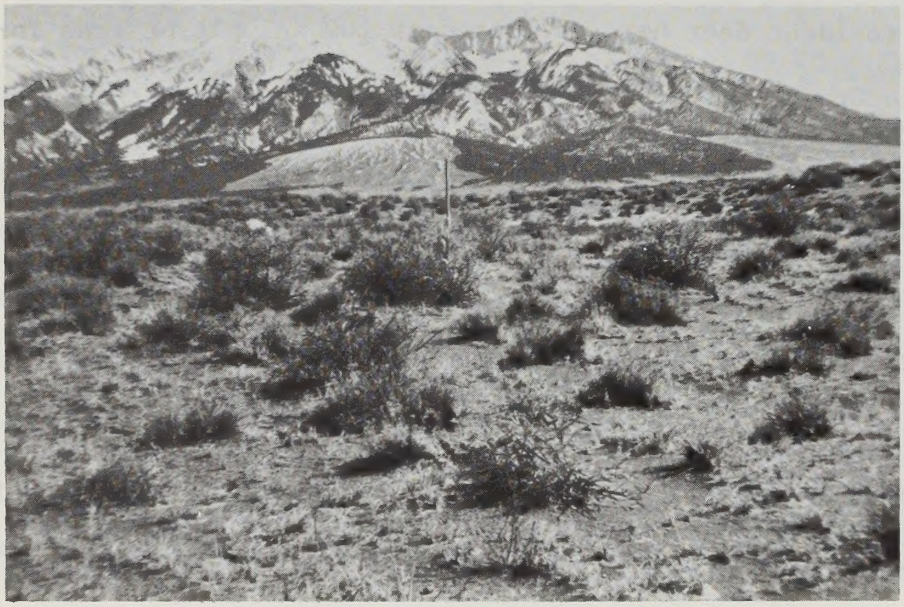


Figure II-19. Deer Crucial Area 6 on the lower slopes of Mt. Blanca. Note the chaining and reseeding tracts.

was chained and reseeded.

Winter deer populations have averaged between 25 and 35 deer-days use per acre in recent years, and the populations are believed to be stable or increasing slightly.

Game range transect data (table II-23, p.II-95) indicate that the ground cover density of browse plants that provide winter forage for deer and elk is higher in chained areas and natural openings (17 percent) than in the undisturbed pinyon-juniper woodlands (10 percent). Browse condition transects also show that these chainings and natural openings between the chainings are more attractive to foraging deer and elk, since 26 to 50 percent of the key browse plants are severely hedged in the chainings and less than 10 percent are severely hedged in the pinyon-juniper near Zapata Creek (table II-23, p.II-95). This overuse is believed to be a combination of browsing by deer and elk and trespass grazing by horses.

Deer Crucial Area 7 is located on the lower slopes of the northern Sangre de Cristo Range from near the town of Crestone north to about Steel Canyon east of Villa Grove. Browse utilization transects near the Orient Mine, Hot Springs Canyon, Cherry Creek, and North Crestone Creek show that this area receives between 20 and 40 deer-days use per acre and 30 to 50 percent utilization of key browse species such as mountain mahogany during normal winters. Deer, however, are forced to concentrate in this area in much higher densities during severe winters, which results in overuse of the area. Average utilization of mountain mahogany was estimated at 75 percent and deer concentrations of up to 60 deer-days use per acre were not uncommon during the severe winter of 1972-73. A post-season hunt was held to reduce the herd in this area in November, 1973, but relatively few deer were harvested because of light snowfall and low hunting pressure.

There has been no documented competition between livestock and deer in this crucial range, but livestock undoubtedly consume some browse, thereby increasing the forage shortage during severe winters. Browse condition data are not available, but browse stands are generally in unsatisfactory condition due to overuse by big game. The total estimated deer population in GMU 82 is 2,000, and about 1,500 are believed to make significant use of NRL (table II-22, p.II-94).

Deer Crucial Area 8 is located in the Peterson Creek and Turquoise Creek drainages in the northern end of the resource area (figure II-17, p.II-97). Browse utilization transects indicate that this area has received from 10 to 25 deer-days use per acre and 25 to 40 percent utilization of key browse species such as mountain mahogany and Gambel oak in recent years (table II-23, p.II-95). Browse stands are generally in good condition.

Deer Crucial Area 9 is located in the Ford Creek, Middle Creek, Cross Creek, and Ward Gulch drainages in the northwestern corner of the resource area (figure II-17, p.II-97). Browse utilization transects in Ward Gulch, Mud Springs, and Poison Gulch (table II-23, p.II-95) indicate that deer use has been light in recent years (5 to 10 deer-days use per acre and 15 to 50 percent utilization); but the area is still considered crucial to the herds that use it. Browse stands are generally in good condition in this area.

The Tracy Canyon and Biedell Creek areas in the southeastern portion of GMU 68 are important deer winter range, but they are not considered crucial at this time. Deer use has averaged about 10 deer-days use per acre in recent years. Some browse stands are in less than satisfactory condition in this area, primarily due to the browsing done by elk. The total estimated deer population in GMU 68 is 1,800, and about 1,250 are believed to make significant use of NRL.

Elk. Elk have generally been increasing in the San Luis Resource Area during the past 25 years. There was, however, a significant decrease in most of the herds as a result of the severe winter of 1972-73. Licenses for elk without antlers have been decreased considerably in all game management units during the past three hunting seasons to allow them to recover. The loss of elk was thought to occur partially because of winter kills and partially because of movement from the area without return.

Gross population estimates for each of the game management units are shown in table II-25. The maximum winter elk population in the resource area is estimated to be about 2,600 at present. Elk herds are believed to be recovering to pre-1972 levels.

Grass comprises at least two-thirds of the diet of elk during all seasons, according to a recent study by Hansen and Reid (1975) of the San Luis Valley (table II-26). Their study also indicates that diet overlap between elk and deer is greatest (23 to 48 percent) during the summer months, when both species prefer grass. Diet similarities between elk and cattle range from about 30 to 50 percent during the summer months, since both prefer grass.

Elk seasonal use ranges, crucial winter ranges, and game management units are shown in figure II-20. Elk range in the resource area is generally above 8,500 feet elevation in the San Juan and Sangre de Cristo mountains. NRL provide mainly winter elk habitat as the moist

TABLE II-25. ELK POPULATION STATUS IN THE SAN LUIS RESOURCE AREA

	Game Management Unit					
	68	79	80	81	82	Total
Estimated total population	1,200	900	1,200	1,100	400	4,800
Estimated population, NRL*	750	300	650	600	300	2,600
Average legal harvest total	306	229	411	293	41	1,280
Percent harvest NRL**	35	20	30	30	25	29
Average legal harvest, NRL**	107	46	123	88	10	374

* The maximum estimated population to use NRL at least part of the year

** The harvest attributed to habitat provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

TABLE II-26. SUMMARY OF SEASONAL FOODS OF ELK
(near Fort Garland, Colorado)

	Seasonal Diets (%)			
Class of Forage	Winter	Spring	Summer	Autumn
Tree	5	8	1	6
Shrub & half shrub	17	20	12	22
Forb	2	1	4	5
Grass	76	71	83	67
Total percent	100	100	100	100

SOURCE: Hansen and Reid 1975, p. 46.

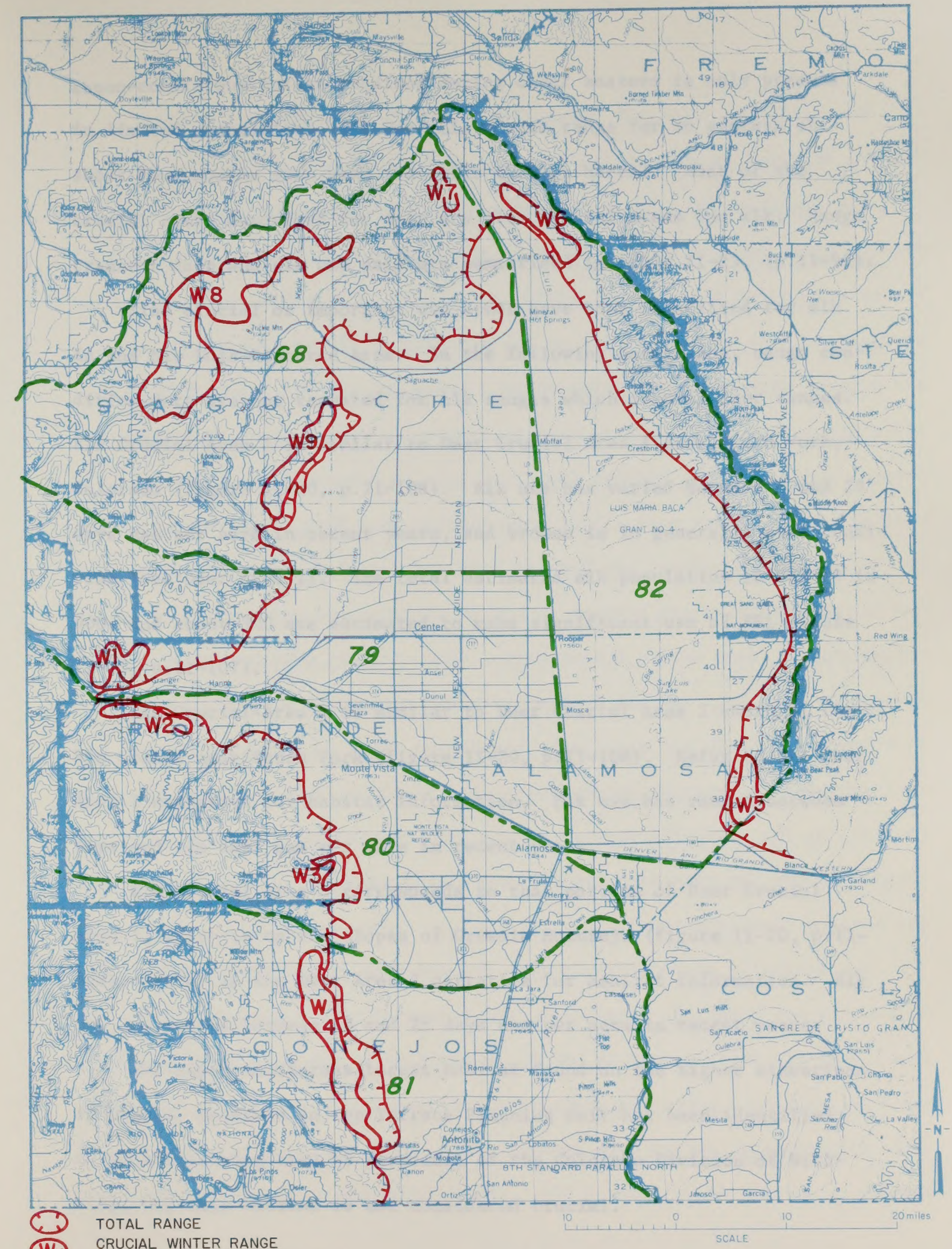


Figure II-20. Elk distribution in the San Luis Resource Area

aspen-coniferous forest required during other seasons is only present in limited quantities. Elk use this winter range for an average of about four months each year (December through March). Most of the crucial areas described for deer are also crucial areas for elk. Range transect data and elk use data are summarized in table II-23, (p.II-95).

Nine crucial or important use areas have been identified for elk in the San Luis Resource Area. In the following paragraphs, range condition data are not repeated for elk ranges which overlap deer ranges. Elk Crucial Area 1 is similar to Deer Crucial Area 1 near South Fork, Colorado (figure II-20, p.II-108). Elk use has varied between 5 and 25 days use per acre in recent years, and browse is in generally good condition (see Deer Area 1). The total estimated elk population in GMU 79 is 900, and about 300 are estimated to make significant use of NRL (table II-25, p.II-107).

Elk Crucial Area 2 is similar to Deer Crucial Area 2 south of the Rio Grande near South Fork (figure II-20, p.II-108). Refer to the Deer Area 2 narrative for habitat information. Elk use has ranged between five and ten days use per acre in recent years.

Elk Crucial Area 3 corresponds to that portion of Deer Crucial Area 3, which is on the slopes of Greenie Mountain (figure II-20, p.II-108). Refer to the Deer Area 3 narrative for habitat information. Elk use has ranged between 10 and 25 days use per acre in recent years.

The aspen-coniferous forest habitat found on the higher elevations of Greenie Mountain in the Terrace Planning Unit has been identified as an elk calving area by personnel of the Colorado Division of Wildlife, but this habitat is not considered crucial.

The estimated total elk population in GMU 80 is 1,200, and about 650 are believed to make significant use of NRL (table II-25, p.II-107).

Elk Crucial Area 4 is an extensive elk winter range between the Alamosa River and the Conejos River in the southwest portion of the San Luis Resource Area (figure II-20, p.II-108). Elk may be concentrated anywhere in this area depending on the severity of the winter, but there are several normal concentration areas. These include Hot Creek (middle elevations), Ra Jadero Canyon, Leandro Canyon, La Jara Canyon, Garambuyo Canyon, and the breaks between Fox Creek and Los Mogotes Peak. Heavy snowfall often causes many elk to move farther east from these areas to the grasslands between Los Mogotes Peak and Garambuyo Canyon. Elk use has generally ranged between 10 and 20 elk-days use per acre in concentration areas during recent years. Much of this area was over-browsed by both deer and elk in the past; and although most vegetation is recovering, there are still some restricted areas in which the mountain mahogany is severely hedged (see table II-23, p.II-95). These areas include the Fox Creek-Los Mogotes breaks (33 percent unsatisfactory), Leandro Canyon (26 percent unsatisfactory), and upper Ra Jadero Canyon (61 percent unsatisfactory).

Elk generally concentrate in this crucial area from summer ranges in the Alamosa River, La Jara Creek, and Conejos River drainages. However, some elk which summer in GMU 81, especially in the area south of the Conejos River, cross the state line into New Mexico to winter; and many are harvested during late seasons there. The total estimated elk population of GMU 81 is about 1,100, of which 600 are believed to make significant use of NRL (table II-25, p.II-107).

Elk Crucial Area 5 is approximately the southern half of Deer Crucial Area 6 (figure II-20, p.II-108) which contains the chaining and reseeding projects on the slopes of Mt. Blanca. Historically, this area is not elk winter range, but the chainings have apparently attracted moderate numbers of elk to move around the base of Mt. Blanca from summer range of the Blanca Trinchera Ranch in Costilla County. Elk concentrations have generally ranged between 5 and 20 elk-days use per acre with a trend toward increasing use in recent years. Range condition data for this area were discussed under Deer Crucial Area 6.

Elk Crucial Area 6 is located on the lower slopes of the northern Sangre de Cristo Range from the vicinity of Steel Canyon east of Villa Grove north to about Raspberry Creek (figure II-20, p.II-108). This area is also not traditionally used as winter range, but the increasing herds have been forced to establish new ranges. This range corresponds with heavy stands of Gambel oak which provide both forage and cover. Elk use has increased to about 10 days use per acre and 28 percent utilization of browse along Raspberry Creek (table II-23, p.II-95). The total estimated elk population in GMU is 82 to 400, and about 300 are thought to make significant use of NRL (table II-25, p.II-107).

Elk Crucial Area 7 is a small area centering on Alder Creek in the extreme northern end of the resource area in GMU 68 (figure II-20, p.II-108). Elk use has averaged about 10 days use per acre and less than 25 percent utilization of browse in recent years. Range condition is considered excellent.

Elk Crucial Area 8 is an extensive winter range in the Ford Creek, Middle Creek, Jacks Creek, Sheep Creek, and Saguache Creek drainages in the extreme northwestern portion of the resource area (figure II-20, p.II-108). Concentration areas depend on the severity of the winter, but they normally include Spring Gulch, Hat Creek, Saguache Park, the northern slopes of Trickle Mountain, and Jacks Creek. Aerial trend counts of this winter range totalled nearly 1,000 elk in early 1975. Elk use has averaged five to ten days use per acre in recent years. Browse stands on the northern slopes of Trickle Mountain are in unsatisfactory condition because of browsing by deer and elk, and the stands in the Hat Creek drainage are overused by both spring-fall livestock and elk.

Elk Crucial Area 9 is located in the Tracy Canyon-Biedell Creek areas in the southeastern corner of GMU 68 (figure II-20, p.II-108). Elk use has averaged from 10 to 15 days use per acre in recent years, and browse stands in the Tracy Canyon and Coolbroth Park areas are somewhat overused by both big game and livestock.

The total estimated elk population in GMU 68 is 1,200, and about 750 are believed to make significant use of NRL (table II-25, p.II-107).

Pronghorn Antelope. Pronghorn antelope were historically common in the San Luis Valley, but by 1939 they had been totally extirpated through excessive hunting. Antelope have been successfully reintroduced into the valley, and there are presently seven separate herds in the resource area, with a total estimated population of 1,145. Gross population estimates for each of the game management units are presented in table II-27.

TABLE II-27. PRONGHORN ANTELOPE POPULATION STATUS
IN THE SAN LUIS RESOURCE AREA

	Game Management Unit							
	73	74	76	77	78	79	80	Total
Estimated total population	200	300	110	150	110	175	100	1,145
Estimated population, NRL*	200	300	110	150	110	175	100	1,145
Average legal harvest total	13	25	9	10	0	15	0	72
Percent harvest, NRL**	75	60	25	50	--	90	--	64
Average legal harvest, NRL**	10	15	2	5	0	14	0	46

* The maximum estimated population to use NRL at least part of each year

** The harvest attributed to habitat provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

Most of the antelope herds are increasing slightly, but excessive mortality primarily caused by poaching is making it difficult for some of the herds to reach optimum numbers. The loss of antelope, especially kids, to coyotes is also believed to be a significant mortality factor in the resource area.

Antelope habitat in the planning area is generally the mixed brush-grassland vegetative type, which forms a broad belt around the valley at the base of the mountains. The lower boundary of the habitat is either cultivated farmland or dense greasewood shrubland and the upper boundary is within the lower edge of timberland. It is considered significant that antelope in the San Luis Valley and other high mountain parks in Colorado spend considerable time in the lower fringes of the timber type.

Most of the present antelope habitat in the San Luis Resource Area is believed to be in satisfactory condition, but there are at least two areas in which winter sheep grazing is apparently in competition with antelope. These areas are discussed later in this statement.

Antelope feed primarily on forbs and browse, with the volume of browse in the diet increasing in the winter as forbs become less palatable (Hoover et al. 1959). Food habits studies conducted in the San Luis Valley (Bear 1973) indicate that shrubs are the most abundant type of forage in antelope diets yearlong, and that forbs are also important, but grasses are insignificant (refer to table II-28). Fringed sage, prickly pear cactus, snowberry, rabbitbrush, scarlet globemallow, and buckwheat are the most important plants in antelope diets.

Competition between antelope and cattle is negligible because of the insignificant amount of grass taken by antelope (Hoover et al. 1959). However, since the diets of antelope and domestic sheep both consist of a high proportion of browse and forbs, antelope are usually in direct competition with sheep, especially when the range is in poor condition. Antelope seasonal ranges, crucial ranges, and management units are shown in figure II-21.

A herd of about 110 antelope is present in the foothills north and northwest of Del Norte (figure II-21). No crucial habitat areas

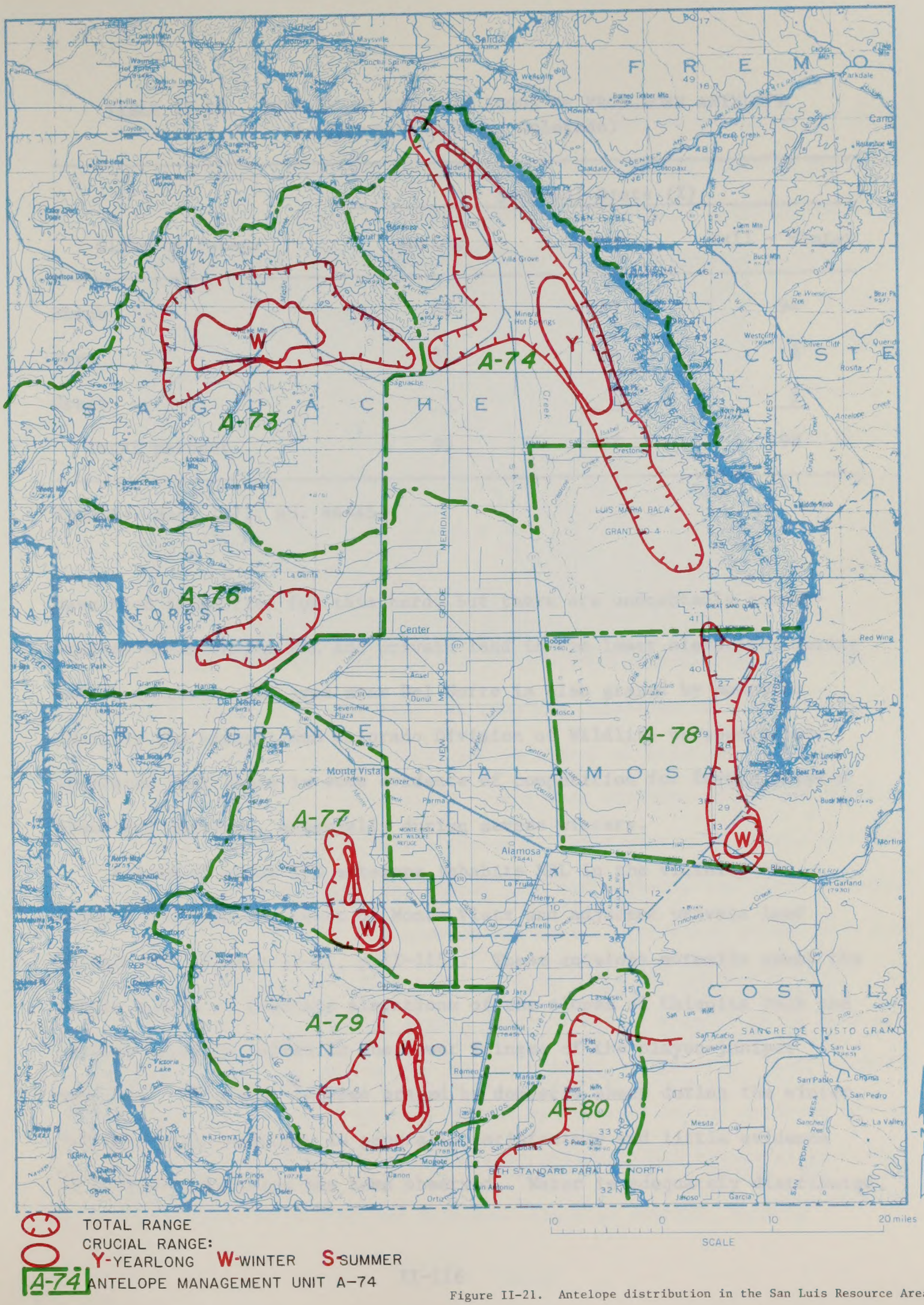


Figure II-21. Antelope distribution in the San Luis Resource Area

TABLE II-28. SUMMARY OF SEASONAL FOODS OF PRONGHORN ANTELOPE (in Saguache County, Colorado)

	Seasonal Diets (%)		
Class of Forage	Spring	Summer	Fall - Winter
Shrub	67	53	94
Forb	31	44	3
Grass	1	1	1
Total percent	99	98	98

SOURCE: Bear 1973, pp. 44-45.

have been identified for this herd, but there are undoubtedly concentration areas on the NRL and private land in the lower elevations during severe winters. The area near Del Norte is also grazed by domestic sheep in the winter; and Colorado Division of Wildlife personnel have indicated that there is some evidence of competition for forage between sheep and antelope, especially during severe winters.

A herd of about 150 antelope inhabits NRL in the vicinity of Greenie Mountain southeast of Monte Vista and adjacent private land to the east (figure II-21, p.II-115). These antelope normally spend the summer months at moderate elevations of the slopes of Chiquita Peak and Greenie Mountain, often in the lower fringes of the pinyon-juniper woodland. This area is also grazed by domestic sheep during the winter, but the range condition is generally satisfactory and little evidence of forage competition has been observed. Water is adequately distributed, with the exception of the area on the south and east slopes of Greenie Mountain at lower elevations. During winters with heavy snowfall, this herd concentrates at lower elevations (figure II-21, p.II-115).

Another herd of about 175 antelope inhabits the vicinity of Los Mogotes Peak in the southwestern portion of the resource area (figure II-21, p.II-115). The entire area is yearlong range during most years, but during winters with heavy snowfall the herd concentrates at lower elevations. Range survey transects indicate that this range is in generally good condition and water sources are adequate (figure II-22). There are several net-wire fences in this vicinity which restrict antelope movements.

A separate herd of antelope is present in the southeastern portion of the resource area (figure II-21, p.II-115). This area is yearlong range for about 100 antelope, but many are believed to cross the Rio Grande to lower areas in Costilla County during severe winters. This herd is cropped heavily by poachers each year. Range condition is generally fair for antelope in this area. A possible forage conflict between domestic sheep and antelope has been identified, and there are several net-wire fences which impede antelope movement.

There are about 110 antelope in a small herd which is located at the base of Mt. Blanca in the southern Sangre de Cristo Mountains (figure II-21, p.II-115). These antelope concentrate at lower elevations in the southern end of their range during deep snow conditions. Range inventory transects indicate that habitat condition is generally good in this range.

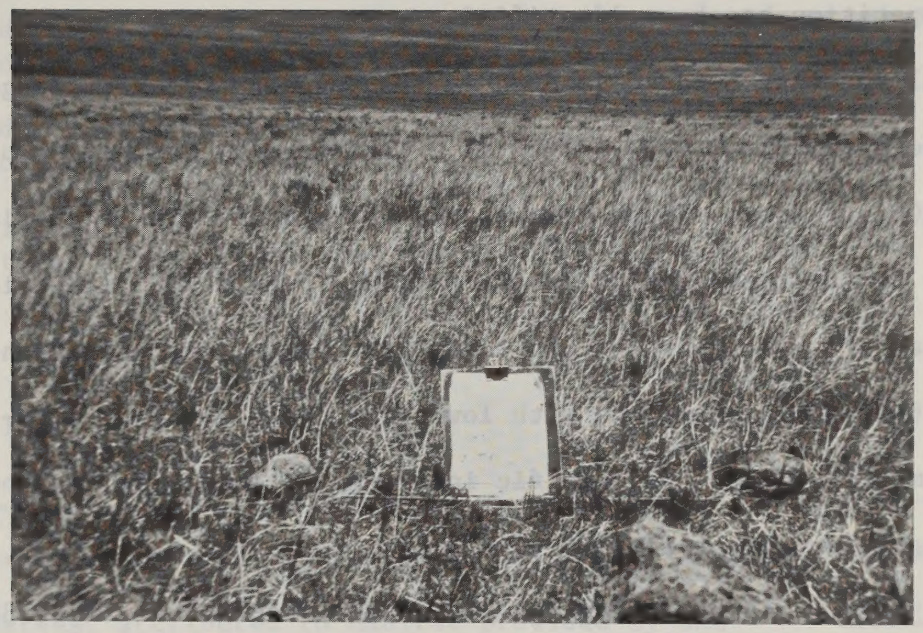


Figure II-22. Typical antelope range in the vicinity of Los Mogotes Peak

The largest antelope herd in the San Luis Resource Area is located in a wide bank of grassland habitat at the base of the mountains in the northern end of the valley (figure II-21, p.II-115). This herd totals over 300 animals.

There are two identified crucial areas in this herd's range. One area between the Orient Mine and Rito Alto Creek is crucial, both as winter range and kidding grounds. The extreme northern end of the range is considered crucial kidding habitat. Antelope move into this area for kidding as soon as snow depths diminish in the spring. Range conditions are generally good throughout this range, and no antelope-livestock competition has been identified.

The final antelope herd is located in the Saguache Creek drainage west of Saguache (figure II-21, p.II-115). This herd is estimated to total about 200 antelope. These animals concentrate at lower elevations in the center of the range during severe winters. The higher elevations of this habitat are generally in good condition. The lower elevations are mostly a blue-grama grassland with low vigor caused by past overgrazing by domestic stock. No specific instances of antelope-livestock competition have been identified in this area.

Bighorn Sheep. Bighorn sheep from two herds which total about 300 animals (table II-29) utilize NRL in the resource area (figure II-23). A small remnant herd, estimated to total about 50 sheep, is present in the central Sangre de Cristo Mountains. A few sheep from this herd make incidental use of scattered NRL tracts at the mouths of Crestone and Sand creeks. This use is considered insignificant.

The Trickle Mountain bighorn sheep herd is considered to be one of only two or three healthy, productive bighorn herds in Colorado. The herd was established from a transplant on the rimrock above Saguache Creek in February, 1951. The fifteen sheep that were released gradually increased to the existing population of about 250 (table II-29). The herd is believed to be near the carrying capacity of the range and is relatively stable in numbers because of hunting and a trapping and

TABLE II-29. BIGHORN SHEEP POPULATION STATUS IN THE SAN LUIS RESOURCE AREA

	Game Management Unit		
	9	10	Total
Estimated total population	50	250	300
Estimated population, NRL*	0	250	250
Average legal harvest total	0	4	4
Percent harvest, NRL**	0	100	100
Average legal harvest, NRL**	0	4	4

* The maximum estimated population to use NRL at least part of each year

** The harvest attributed to habitat provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

transplanting program designed to remove surplus animals for establishment of herds elsewhere in Colorado.

Lungworms (Protostrongylus stilesi) are present in the Trickle Mountain herd, but they have not yet reached the level of concentration which is believed to have been the primary cause of massive die-offs and poor health in most other Colorado bighorn herds. Lungworms are transmitted from sheep to the alternate hosts (tiny land snails) by defecation, and the cycle is completed when sheep ingest infected snails (Hibler 1972).

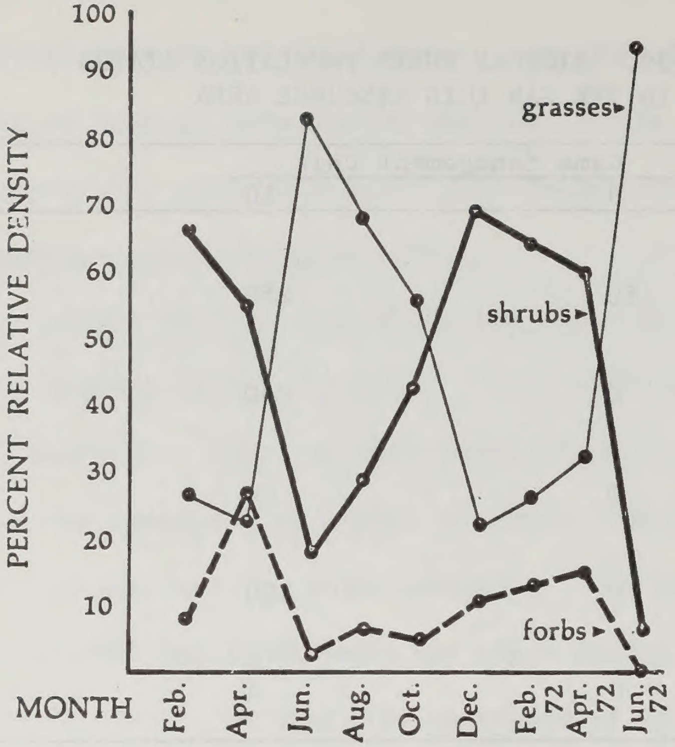


Figure II-23. Monthly forage class utilization rates (present relative density) for bighorn sheep in Saguache County, 1971-1972 (Todd 1975, p. 110)

Lungworm larvae are also transmitted through the placenta from ewe to lamb, especially when lungworm-infected sheep and snails are concentrated. This transmission causes a high incidence of lamb mortality. Any factor which tends to concentrate the sheep would increase the possibility of mortality because of the lungworm-pneumonia complex (Hibler 1972).

The habitat of the Trickle Mountain herd is primarily a low altitude pinyon-juniper range. Vegetation is predominately pinyon-juniper woodland with a grass and brush understory with grasslands on the lower and drier sites and coniferous forest on the higher and moister sites. Common forage plants include bunchgrasses such as Arizona fescue, mountain muhly, slimstem muhly, Parry oatgrass, needle-and-thread, dryland sedges, blue grama, bluegrass, yucca, cacti, mountain mahogany, winterfat, and fringed sage.

Todd (1975) describes the food habits of the Trickle Mountain herd as follows: "Grasses and sedges made up the bulk of the yearly diet (46%), followed closely by shrubs (45%) and forbs (9%). Widespread variation /occurs/ in species consumed, but fringed sage, sedges, and four genera of bunchgrasses /are/ the major annual food items." Table II-30 shows the relative species composition of bighorn diets and figure II-23 (p.II-121) shows the relative density of the major forage classes in their diet (Todd 1975). In addition, Todd (1975) concludes that foodplant selectivity is also closely related to plant succulence.

The Trickle Mountain herd range is grazed by cattle, deer, elk, antelope, and bighorns. Elk, antelope, and deer all use the area moderately. However, the areas used are not generally the same as the bighorn concentration areas, and there are no known areas of competition between sheep and the other large herbivore game animals. Cattle graze portions of the bighorn range, but the sheep concentration areas are steep rocky slopes which seldom are used by cattle. Bear and Jones (1973) believe that " . . . in general, there is likely only limited competition between Bighorns and other ungulates . . . " in the Trickle Mountain area.

The seasonal and crucial ranges of the Trickle Mountain bighorn herd are shown in figure II-24. They concentrate around Trickle Mountain

TABLE II-30. FOODS OF BIGHORN SHEEP

	Seasonal Period				
Species a/	Winter	Spring	Summer	Fall	Yearly
Shrubs					
Artemisia spp. b/	59.8	23.2	tr	26.9	34.6
Unknown shrubs c/	tr	6.1		14.0	5.1
Cercocarpus montanus		tr	12.1		tr
Holodiscus dumosus		tr	10.0		tr
Other shrubs	tr	tr	tr	tr	tr
Average total shrubs	66.5	32.9	29.4	43.9	44.9
Grasses and Sedges					
Muhlenbergia spp.	tr	18.0	7.2	tr	9.5
Carex spp.	tr	11.7	15.2	13.5	8.7
Festuca spp.	6.5	8.3	10.6	11.4	8.3
Bouteloua gracilis	tr	5.1	23.3	8.7	6.5
Poa spp.	5.5	6.8	5.5	8.0	6.3
Stipa spp.	tr	tr	tr	9.5	tr
Other grasses	tr	tr	tr	tr	tr
Average total grasses and sedges	22.8	56.9	64.9	53.9	46.1
Forbs					
Yucca glauca	8.4	5.5		tr	5.3
Other forbs	tr	tr	5.7	tr	tr
Average total forbs	10.7	10.3	5.7	tr	9.0

a/ Species representing 5.0 percent or more of the diet in at least one season
b/ Mostly A. frigida
c/ Rosaceae family
tr = trace (less than 5.0 percent)

NOTE: Average percent relative densities of plant fragments in the feces of bighorn sheep in Saguache County. Figures represent percentages in seasonal diets.

SOURCE: Todd 1975, p. 110.

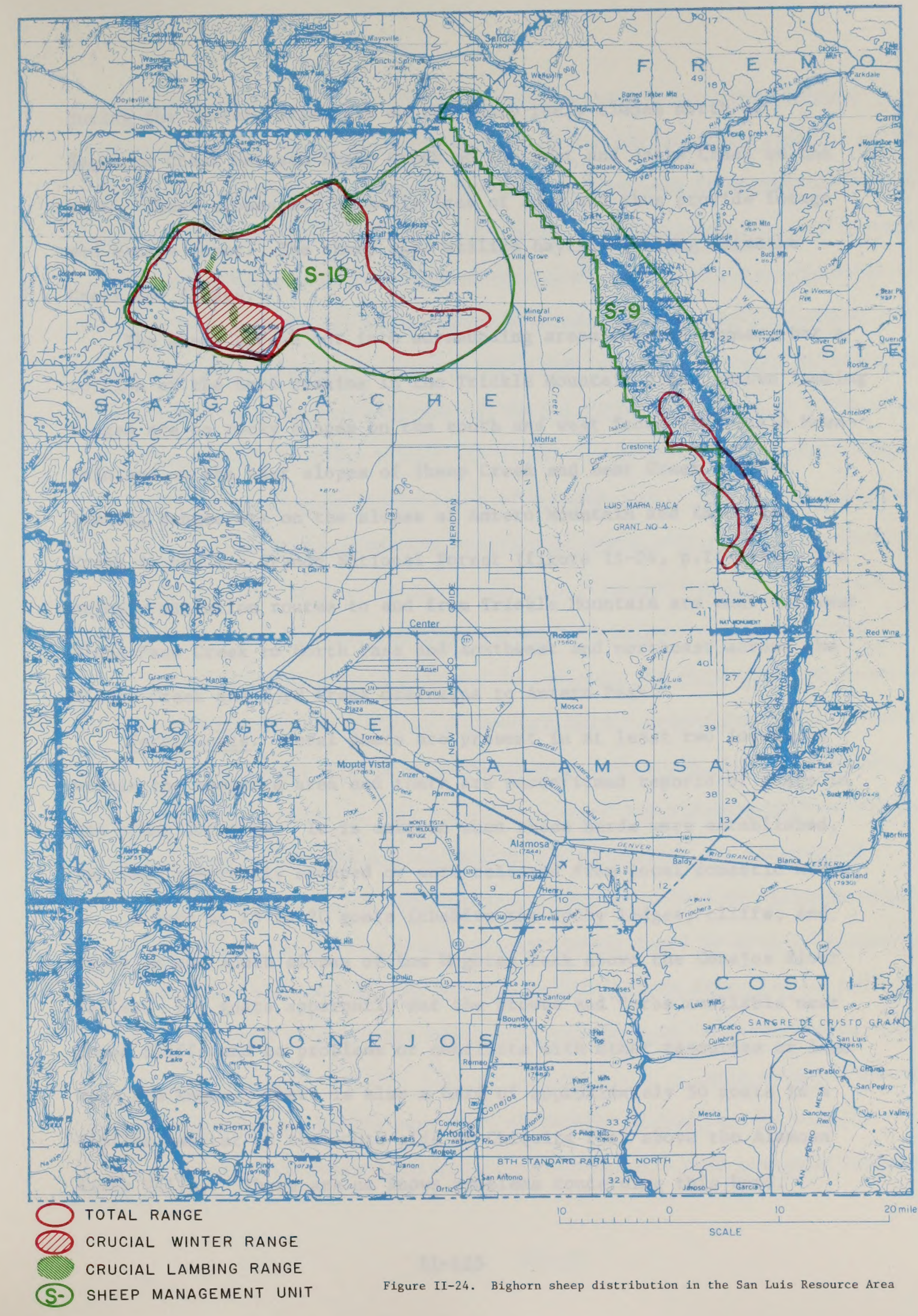


Figure II-24. Bighorn sheep distribution in the San Luis Resource Area

during the winter, primarily on the steep rocky slopes north of Saguache Creek between Sheep Creek on the west and Jacks Creek on the east. These slopes are normally free of snow and thus provide forage and escape cover. The sheep also utilize hayfields along Saguache Creek for forage.

The sheep spread out into surrounding areas for the summer, but a portion of the herd remains in the Trickle Mountain area. Known lambing ranges are on rocky slopes on the south and west faces of Trickle Mountain and on the east slopes of Sheep Creek and Bear Creek. Other lambing ranges are on the slopes of Antero Mountain and East Pass Creek in the Rio Grande National Forest (figure II-24, p.II-124). The primary migration routes to and from Trickle Mountain are east and west along Pass Creek to North Pass and southwest and northeast across the Middle Creek and Ford Creek drainages to Antero Peak.

Feral Goats. Feral goats are present in at least two locations within the resource area and there are unconfirmed reports of goats in one other location. It is unknown when these herds were established, but they apparently escaped or were released from local domestic herds.

A herd of 15 to 20 goats inhabits the rocky ledges, cliffs, and caves on the south slopes of Los Mogotes Peak above the Conejos River Valley. The goats apparently eat the browse and forbs available near these cliffs and no problems or conflicts with other resources or land uses are known. There is also a herd of approximately 30 goats in a similar habitat on the south side of Chiquita Peak above the Alamosa River Valley. There are no known problems concerning this herd.

Large Predators. Mountain lion populations are presently thought to be low but stable in the San Luis Resource Area. They had been gradually declining until recent years, however, because of an unrestricted harvest and an intolerance of people. Lions were classified as predators in Colorado until 1965, when they were reclassified as big-game animals.

Mountain lions are distributed throughout the remote mountainous portions of the resource area, but their presence is usually associated with areas in which their prey (primarily deer) is concentrated. The highest densities are thought to be in the remote areas of the Sangre de Cristo Mountains. Since harvest is now controlled, the availability of prey and freedom from human disturbance are the primary factors controlling lion populations.

The problems and conflicts described for deer and other prey species are indirectly the problems of mountain lions. There is also a conflict between having a high population of lions and attempting to increase deer herds since each lion is known to kill a significant number of deer annually for food.

Black bears are present in low numbers in the higher and more remote mountainous regions of the resource area. Bears are also occasionally seen at lower elevations, apparently in search of food; but this is not their normal habitat. There are no known significant bear-related problems or conflicts with other resources or land uses in the resource area.

Coyotes are present in moderately high populations throughout the resource area and they are apparently increasing because of recent restrictions on using poisoning and other control methods. The total extent of coyote predation on domestic sheep and wildlife species such as deer and antelope is unknown, but significant losses are undoubtedly occurring. Coyotes are believed to be largely dependent on small mammals for food, but they are known to turn to larger animals if their normal prey is not readily available. Coyotes are also believed to be a serious predator on waterfowl nests at the Blanca Wildlife Habitat Area. Population and harvest estimates are not available.

Small Game and Furbearers. Cottontail rabbits are present throughout the planning area in low to moderate numbers, and snowshoe hares are present in the limited areas of coniferous forest. Area-wide harvest data are presented for both species in table II-21 (p.II-90).

Furbearers present on NRL in the resource area include the beaver, muskrat, and mink. Beaver are believed to be present along all permanent streams, but no recent inventory work is available. A more likely probability is that they are present along the approximately 10.5 miles of permanent stream, which is bordered by riparian woodlands. Beaver depend on deciduous woody plants for food and dam materials in most areas. Mink and muskrat are believed to be present along all permanent streams and most permanent ponds and lakes in the resource area. No trapping harvest data were available.

Nongame Mammals. A total list of mammals known to inhabit the planning area is contained in Appendix 3, but information on most is insufficient to determine their population or habitat status. The following small mammals, however, are typical residents of the important biotic communities (vegetative types) in the planning area.

The long-tailed vole, western jumping mouse, pocket gopher, and raccoon are typical residents of the riparian woodland community throughout the planning area; and ring-tailed cats have been observed along the Rio Grande on the southeastern border of the San Luis Resource Area. The least chipmunk, Ord's kangaroo rat, and white-tailed jackrabbit are characteristic of the salt-desert-shrub community; and the white-tailed prairie dog, thirteen-lined ground squirrel, and Ord's kangaroo rat are characteristic of both the half-shrub and the grassland communities.

The bobcat is typical of the mountain shrub community; and the pinyon mouse, bushy-tailed woodrat, and porcupine are typical of pinyon-juniper woodlands. The rock squirrel is characteristic of rocky slopes; and the Colorado chipmunk, porcupine, and red-backed vole are characteristic of coniferous forests. The deer mouse, long-tailed weasel, and golden-mantled ground squirrel are typical of all habitat types throughout the resource area.

The San Luis Valley, in particular the vicinity of the Great Sand Dunes National Monument, has been identified as the area with the highest degree of uniqueness of small mammals in Colorado (Armstrong 1972). Seven subspecies of small rodents are possibly endemic there. These subspecies are primarily important as subjects of scientific study.

Threatened or Endangered Species

A list of endangered species of the San Luis Resource Area is compiled in table II-31. The list includes four species whose presence is confirmed or probable and an additional six species whose presence is hypothetical.

There is a distinct probability that the endangered black-footed ferret is present on NRL within the San Luis Resource Area. An experienced employee of the U.S. Fish and Wildlife Service has made several unconfirmed observations of ferrets in the Little Mogotes area. There has also been strong evidence of ferrets in the Punche Valley area in the southwestern corner of the San Luis Resource Area. Copies of correspondence regarding recent ferret investigations in these areas and a chronological listing of ferret observations in the San Luis Valley are included in Appendix 3.

Black-footed ferrets are dependent on prairie dogs for food and live principally in prairie-dog towns (figure II-25). Prairie dogs are normally found in areas that are apparently overgrazed, but the overuse is usually attributed to the prairie dogs themselves rather than livestock. There are no known significant conflicts between prairie dogs and livestock on NRL in the San Luis Resource Area. Figure II-26 shows a black-footed ferret.

The American peregrine falcon is one of two endangered birds that are inhabitants of the resource area. The peregrine falcon is a rare yearlong resident, but there are now known nesting aeries on NRL. At least one active peregrine aerie is on national forest lands in the

TABLE II-31. ENDANGERED WILDLIFE OF THE SAN LUIS RESOURCE AREA

Common Name	Scientific Name	Status and Comments 1/
Mammals		
Black-footed Ferret	*Mustela nigripes*	E, C - Possible yearlong resident
Spotted Bat*	*Euderma maculatum*	C
Grizzly Bear*	*Ursus horribilis*	C
Timber Wolf*	*Canis lupus*	C
Wolverine*	*Gulo luscus*	C
River Otter*	*Lutra canadensis*	C
Birds		
American Peregrine Falcon	*Falco peregrinus anatum*	E, C -Rare yearlong
Whooping Crane	*Grus americana*	E, C -Rare migrant
Southern Bald Eagle*	*Haliaeetus leucocephalus*	E
Fish		
Rio Grande Cutthroat Trout	*Salmo clarki virginalis*	C

1/ Status:
E = Endangered, threatened with extinction official list as published in Federal Register through 10/73
C = Declared endangered in Colorado by Colorado Wildlife Commission, 7/74
* = Presence is hypothetical--within original distribution but no recent evidence

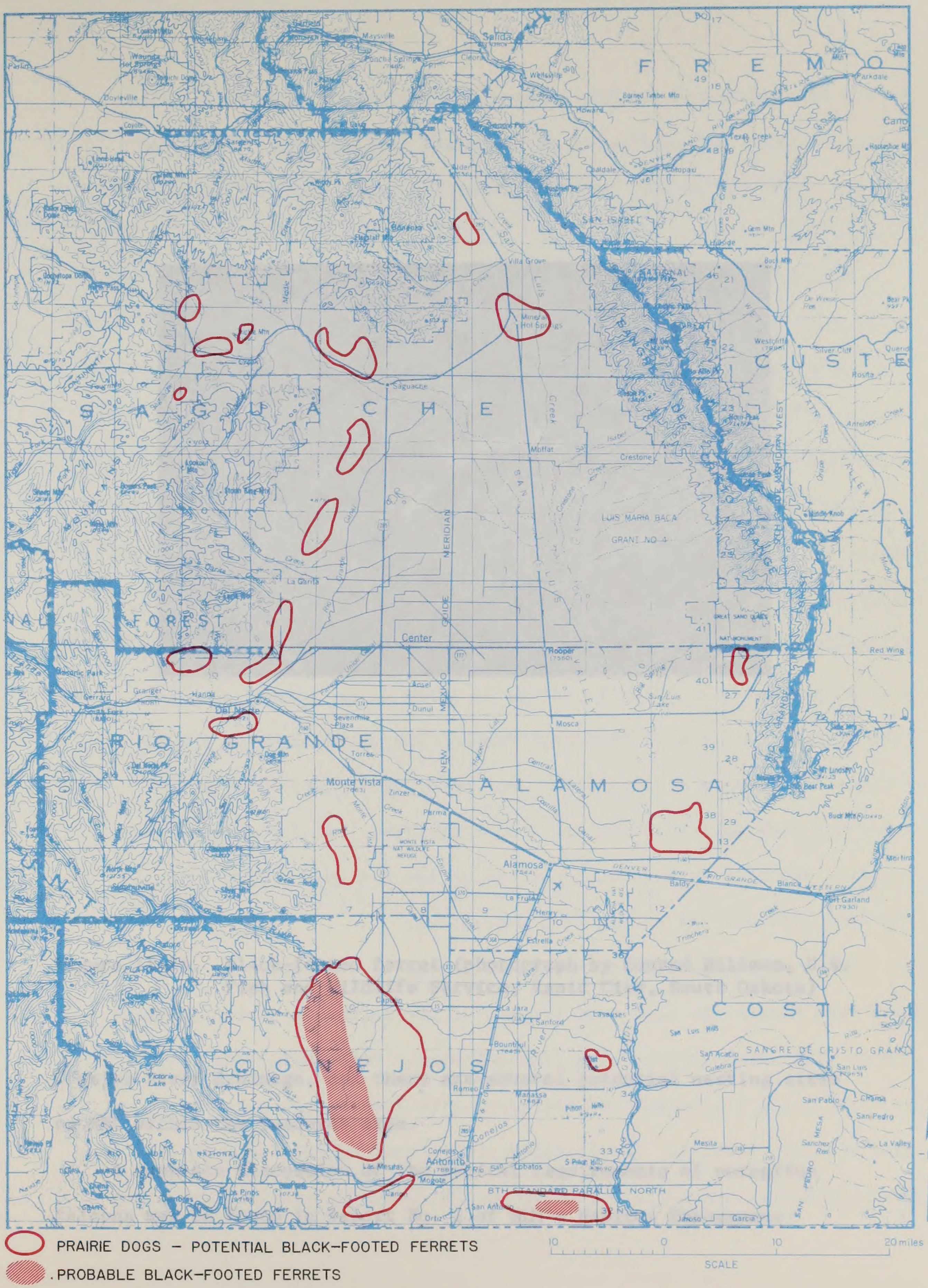


Figure II-25. Prairie dog and potential black-footed ferret distribution in the San Luis Resource Area.

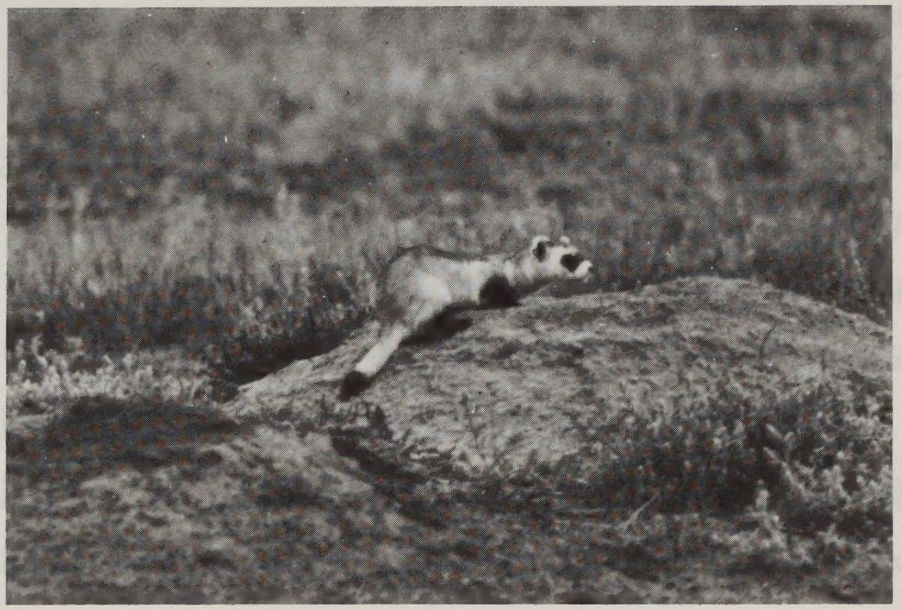


Figure II-26. Black-footed ferret (photograph by Conrad Hillman, U.S. Fish and Wildlife Service, Rapid City, South Dakota)

Conejos River drainage, and there are several potential nesting sites on NRL within the resource area.

A complete discussion of the habitat requirements of peregrine falcons may be found in Report No. 1 of BLM's Habitat Management

Series for Endangered Species. These falcons depend largely on small birds for food, and cliffs are their normal nesting site. Preferred nesting sites are usually high cliffs with a broad southern exposure overlooking permanent water.

Many of the problems and conflicts of peregrine falcons are associated with their intolerance of humans. Human disturbance of nesting aeries is a major source of nest abandonment. Another major source of lost productivity has been traced to egg-shell thinning caused by cumulative pesticide poisoning.

The endangered whooping crane is in the San Luis Valley as a result of an experiment being conducted by the U.S. Fish and Wildlife Service. Eggs taken for the one remaining whooping crane nesting area in Canada were placed under greater sandhill crane foster parents at Gray's Lake National Wildlife Refuge in Idaho in an attempt to establish a separate flock of whooping cranes. The sandhill crane foster parents are part of a large flock that uses the San Luis Valley as an important stop during spring and fall migrations. At least four juvenile whooping cranes were observed in the San Luis Valley during the fall 1975 and the spring 1976 migrations.

Whooping cranes utilize marsh and wet-meadow habitat. In addition, open farm fields are also used because of the influence of the sandhill cranes with which the whooping cranes travel. Whooping cranes have declined primarily because of conflicts with humans, who have destroyed much of their habitat. The whooping cranes that migrate through the San Luis Valley are not expected to use NRL with the possible exception of the Blanca Wildlife Habitat Area.

The only trout native to the San Luis Valley is the Rio Grande cutthroat trout (*Salmo clarki virginalis*, figure II-27). This species, classified as threatened by the Colorado Division of Wildlife and proposed for similar status on the federal list, was probably once found in all permanent streams in the valley (Jordan 1891) but is now limited to Trinchera Creek and some of its tributaries, all on private lands (Behnke 1975). Plans are well under to way to reestablish this species in Blanca Wildlife Habitat Area and Tuttle Creek with the cooperation of BLM, U.S. Forest Service, and Colorado Division of Wildlife. This trout is the only known endangered species found in the aquatic and riparian communities.

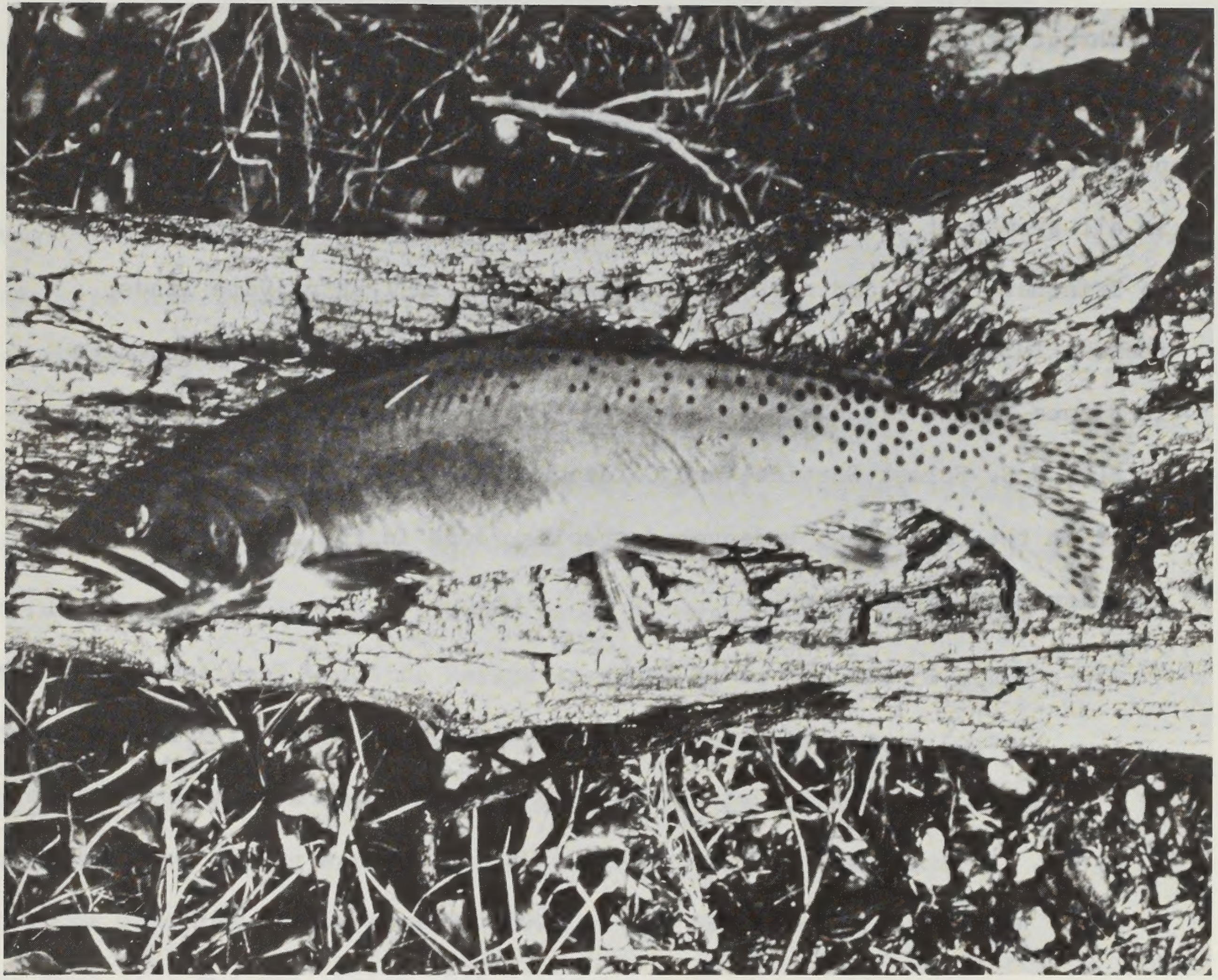


Figure II-27. Rio Grande cutthroat trout (Salmo clarki virginalis) from Trinchera Creek (courtesy Colorado Division of Wildlife)

Aquatic and Riparian Communities

Existing aquatic and riparian communities of the San Luis Valley are the combined result of innumerable physical, chemical, and biological processes acting on the habitat and its associated vista. In this section, plants and animals and their physical habitat are generally discussed together as a part of the aquatic and riparian communities because of the complex ties between them. Discussing the components separately reduces the importance of the interrelationships that are a vital part of healthy communities.

Aquatic Community

Surface waters of the San Luis Valley are partially discussed in the Unit Resource Analysis for the Saguache Planning Unit (U.S. Department of the Interior 1972a) and the Unit Resource Analysis for the Blanca, Conejos, San Luis, and Terrace Planning Units (U.S. Department of the Interior 1975a). Additional information is available from the Colorado Water Conservation Board (1972), the San Luis Valley Regional Development and Planning Commission (1972), and U.S. Geological Survey publications.

The greatest portion of surface waters on NRL is found in flowing streams, with only a small fraction retained in ponds and reservoirs. Approximately 60 percent of the total water income to the valley comes via streams that flow out of the surrounding San Juan and Sangre de Cristo mountains. The majority of these streams sink into the porous alluvial materials bordering the mountains and terminate on or before reaching NRL. The Regional Development and Planning Commission publication (1972) cites flow data from Deadman Creek in the northwest region of the valley. A volume of 7 cubic feet per second (cfs) was found where Deadman Creek first emerges onto the alluvial material; this volume dropped to 1 cfs within 3.7 miles and disappeared entirely within 8 miles. The lengths and volumes of these ephemeral streams then depend mainly upon source flow and substrate porosity. During snowmelt and summer thundershowers, these streams may reach miles out onto the valley floor and within a few weeks shrink back into national forest lands.

There are presently 47 miles of permanent streams on NRL in the San Luis Valley (table II-15, pp.II-47 f.). Thirty-three of these permanent stream miles were surveyed during October 1975 (Supplemental Data to the San Luis URA-MFP). Of the aquatic communities found on these streams, 11.2 percent are in excellent condition; 63.9 percent, poor; and 1.5, non-existent (tables II-32 and II-33). These classifications are explained in table II-33. Suitability for fish is only one of the criteria used in the evaluation. In some of the smaller streams (i.e., Tuttle, San Luis, and portions of Ford Creek), there will never be enough water to support major fisheries; but the total communites are in fairly good condition.

The aquatic flora and fauna on NRL in the San Luis Valley are found mainly in the 47 miles of permanent streams, identified in table II-32. The native species have adapted to variable water flows and fluctuating temperatures under natural conditions. These species have either maintained their populations under the more widely fluctuating extremes caused by man or have died out. Aquatic flora includes several groups

TABLE II-32. AQUATIC AND RIPARIAN CONDITIONS ON SELECTED PERMANENT STREAMS IN THE SAN LUIS VALLEY

Stream Name*	Stream Miles	Aquatic Community**	Riparian Community**	Riparian Stability
Lower Ford Creek	1.5	Poor	Poor	Stable
Middle Ford Creek	0.5	Good	Good	Declining
Upper Ford Creek	1.0	Fair	Fair	Declining
Baxter Creek	1.5	Poor	Fair	Declining
Lower Tuttle Creek	1.0	Good	Excellent	Stable
Upper Tuttle Creek	1.0	Fair	Poor	Improving
Lower Sheep Creek	0.3	Excellent	Good	Improving
Upper Sheep Creek	1.7	Excellent	Excellent	Stable
Hat Springs Creek	1.8	Poor	Fair	Declining
Cross Creek	0.5	Good	Good	Stable
Kerber Creek	0.5	Nonexistent	Nonexistent	Stable
Alder Creek	0.4	Good	Good	Declining
Fisher Creek (Head of San Luis Creek)	0.5	Poor	Poor	Stable
Middle San Luis Creek	0.4	Fair	Poor	Stable
Upper San Luis Creek	0.6	Excellent	Good	Improving
Dorsey Creek	0.5	Good	Good	Stable
Middle Garner Creek	0.3	Excellent	Excellent	Stable
Lower Garner Creek	1.7	Good	Fair	Improving
Cotton Creek	0.8	Excellent	Good	Stable
Rio Grande (A)	7.0	Good	Poor	Stable
Rio Grande (B)	5.0	Good	Good	Stable
La Jara Creek	2.5	Good	Good	Declining
Alamosa River	2.0	Good	Good	Stable
Total miles	33.0			

* See table II-15, (p.II-47 f.) for stream locations.

** See classification system for explanation (table II-33).

TABLE II-33. CLASSIFICATION SYSTEM FOR AQUATIC AND RIPARIAN COMMUNITIES IN THE SAN LUIS VALLEY

A. Aquatic Community: Composed of a watery habitat and those organisms that are partially or totally submerged in it for most of their lives.

1. Excellent - Abundant, diverse, and stable community. Cover for fish available. Pools and riffles supporting optimum production of producers and consumers.

2. Good - Community diverse, but below potential. Cover available, but somewhat reduced. Pools and riffles supporting good numbers of producers and consumers.

3. Fair - Community noticeably limited in numbers and diversity. Cover limited and limiting animal populations. Some fish present, but populations and reproductive potentials being reduced by the habitat.

4. Poor - Community barely surviving. Cover lacking. A few fish may be surviving, but little chance of continued survival. Diversity of invertebrates low, but numbers of certain species may be high.

5. Nonexistent - Self-explanatory.

B. Riparian Community: Habitat of the stream and/or pond banks and bottoms containing terrestrial plants and animals in need of a near source of continuous water or the organisms that associate with these plants and animals.

1. Excellent - Diversity and abundance of typical riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) good. Good age distribution, reproduction evident. Soil mostly covered with vegetation, bank erosion generally lacking. Cover for animals abundant. Vegetation shades water most of the day.

2. Good - Most groups of typically riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) present at or near stream border, but numbers may be reduced. Age diversity fair, reproduction evident. Some bare soil areas noticeable, but erosion at low levels. Riparian animals somewhat reduced or typical species missing due to cover loss. Vegetation shades water at least part of the day.

TABLE II-33. CLASSIFICATION SYSTEM FOR AQUATIC AND RIPARIAN COMMUNITIES IN THE SAN LUIS VALLEY (cont.)

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3. Fair - Many of the typically riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) rare or missing from stream border. Age diversity lacking, little sign of reproduction. Bare soil may be common. Animal populations greatly reduced from lack of cover; may only be transitory in the community. Vegetative shade on stream lacking or only during morning and evening hours.
4. Poor - Typically riparian plants and animals scanty or lacking in both numbers and diversity. Little age variation, no sign of reproduction. Range plants (i.e., rabbitbrush, sagebrush, etc.) abundant down to water edge. Erosion of bare soil normally high, but may be reduced in monotypic grass communities which provide good ground cover but little diversity or animal cover. No shade on water from vegetation.
5. Nonexistent - Self-explanatory.

of vascular plants, singular and colonial green and blue-green algae, diatoms, and various one-celled microorganisms. The Rio Grande has nearly continuous pondweed beds (Potamogeton) from Monte Vista to the New Mexico state line. The more torrential permanent waters (i.e., Alamosa River, La Jara Creek) have fewer aquatic plants but support some populations in the quiet backwaters and pools. Emergent plants, mainly sedges and rushes, exist along some of the streams and most of the ponded waters. Cropping of the emergents by livestock is variable and apparently caused by species preferences and accesses.

Aquatic animals inhabit intermittent and permanent waters. Zooplankton and amphipods are found in permanent ponded waters, such as those in Blanca Wildlife Habitat areas, but are lacking for the most part in flowing waters. Aquatic insects are widespread in all aquatic habitats. In ephemeral waters highly migratory species such as adult backswimmers (Notonectidae) and water boatmen (Corixidae) are able to establish rapidly in new habitats by flying across dry land. Less mobile adult insects and immatures--especially stoneflies (Plecoptera), mayflies (Ephemeroptera), caddisflies (Trichoptera), and blackflies (Diptera)--are carried downstream by the current from permanent waters into newly created habitats. As the waters recede upstream, those insects that are able emigrate to other habitats; the less mobile concentrate in rapidly dwindling pools and eventually die.

Permanent waters have more stable and diverse communities. Many orders of aquatic insects (including those listed in the previous paragraph, craneflies and other diptera beetles, and dragonflies), crustaceans, and molluscs add depth and breadth to the species diversity. Aquatic vertebrates include mammals (beavers and muskrats), frogs, toads, salamanders, and over 30 species of fish (table II-34). Three exotic salmonid species are currently being stocked by the Colorado Division of Wildlife (table II-35), in addition to the native Rio Grande cutthroat trout (Salmo clarki virginalis). At least 27 additional fish species inhabit the permanent streams and private lands and several of the man-made reservoirs and canals. A creel survey showing composition of catch is presented in table II-36.

Existing conditions on several permanent NRL streams are presented in table II-32 (p.II-138). It should be noted that the aquatic and riparian communities have many close interrelationships and need to be evaluated together in table II-32 (p.II-138) to provide a better understanding of their current status. At present nearly all of these communities suffer from a general lack of water.

Numerous springs and seeps are found throughout the foothill areas of the Sangre de Cristo and San Juan mountains on NRL. These isolated wet areas, surrounded by inhospitable aridity, are havens for remnant populations of aquatic plants and animals that were once more widely distributed during wetter periods. As swamps and lakes began drying up, these organisms retreated to smaller and still smaller areas until presently they are found only in small, isolated localities. Most common remnant species involve snails, amphipods, isopods, mites, fish, and plants (Cole 1966, Taylor 1968). The potential for discovering a new species within these groups, endemic to the San Luis Valley, is quite

TABLE II-34. AQUATIC VERTEBRATES IN THE SAN LUIS VALLEY

Mammals (Armstrong 1972)

Castor canadensis		Beaver	
Ondatra zibethicus		Muskrat	
Mustela vison		Mink	

Amphibians (Stebbins 1966)

Bufo boreas		Western toad	
Bufo woodhousei		Woodhouse's toad	
Bufo cognatus		Great Plains toad	
Scaphiopus bombifrons		Plains spadefoot toad	
Rana pipiens		Leopard frog	
Rana catasbeiana	(?)	Bullfrog	(I)
Pseudacris triseriata		Chorus frog	
Hyla arenicolor	(?)	Canyon tree frog	
Ambystoma tigrinum		Tiger salamander	
Chrysemys picta	(?)	Painted turtle	

Fish (Koster 1957, Beckman 1961, Conway 1975)

Salmo clarki	*	Cutthroat trout	
Salmo gairdneri		Rainbow trout	(I)
Salmo trutta		Brown trout	(I)
Salvelinus fontinalis		Brook trout	(I)
Esox lucius		Northern pike	(I)
Pantosteus plebeius		Rio Grande mtn. sucker	(I)
Catostomus commersoni		White sucker	(I)
Ictalurus punctatus		Channel catfish	(I)
Ictalurus melas		Black bullhead	(I)
Pylodictis olivaris	(?)	Flathead catfish	(I)
Cyprinus carpio		Carp	(I)
Tinca tinca	(?)	Tench	(I)
Gila nigrescens		Rio Grande chub	
Hybopsis gracilis		Flathead chub	
Rhinichthys cataractae		Longnose dace	
Hybognathus platicus		Plains minnow	
Pimephales promelas		Flathead minnow	
Notropis jemezanus		Rio Grande shiner	
Notropis proserpinus		Proserpine shiner	
Notropis lutrensis	(?)	Red shiner	
Notropis simus		Bluntnose shiner	
Anguilla rostrata	(?)	American eel	

TABLE II-34. AQUATIC VERTEBRATES IN THE SAN LUIS VALLEY (cont.)

Micropterus salmoides		Largemouth bass	(I)
Micropterus dolomieui		Smallmouth bass	(I)
Lepomis cyanellus		Green sunfish	
Pomoxis nigromaculatus		Black crappie	(I)
Lepomis macrochirus		Bluegill	(I)
Chaenobryttus gulosus	(?)	Warmouth	(I)
Stizostedion vitreum		Walleye	(I)
Perca flavescens		Yellow perch	(I)
Tilapia mossambica		Tilapia	(I)

(?) Questionable if self-sustaining populations presently exist in the valley.

(I) Those species introduced into the valley during historic times.

* Several subspecies of cutthroat trout are known to have inhabited the valley. The native species, S. clarki virginalis, is still found in several tributaries of Trinchera Creek (Behnke 1975). The "Native" cutthroat trout planted by Colorado DOW is usually the Yellowstone cutthroat trout (S. clarki lewisi).

NOTE: 1. This list is most probably incomplete due to the numerous introductions that are continually occurring. For example, several minnows and sunfish not listed above are likely to be found somewhere in the valley.

2. The San Luis Unit Resource Analysis (U.S. Department of the Interior 1975a) also lists the following species: Cottus bairdi (Mottled sculpin), Fundulus kansae (Plains killifish), and Fundulus sciadicus (Plains topminnow).

TABLE II-35. COLORADO DIVISION OF WILDLIFE STOCKING RECORDS FOR PERMANENT STREAMS CROSSING NRL (1962-1974)

Stream	Species Stocked	Date	Numbers
Alamosa River	cutthroat trout	1973	2,550
" "	" "	1974	3,200
Alder Creek	brook trout	1973	1,000
Cotton Creek	rainbow trout	1968	2,000
" "	" "	1969	1,725
" "	cutthroat trout	1970	3,000
Ford Creek	cutthroat trout	1969	2,000
Kerber Creek	rainbow trout	1966	1,000
" "	brook trout	1967	2,000
" "	" "	1971	1,000
" "	cutthroat trout	1971	1,000
La Jara Creek	rainbow trout	1962	8,700
" " "	" "	1964	7,000
" " "	" "	1966	2,000
" " "	" "	1972	6,048
Rio Grande (state line to Monte Vista)*	brown trout	1973	10,000
" "	channel catfish	**	**
" "	brown trout	**	**
" "	northern pike	1962	1,292
Sheep Creek	rainbow trout	1962-1972	@ 2,000 +-
Tuttle Creek	cutthroat trout	**	**

* Rainbow trout, brook trout, and cutthroat trout have been stocked in upstream areas.

** Date and/or number of stocking unknown.

TABLE II-36. COLORADO DIVISION OF WILDLIFE CREEL SURVEYS ON STREAMS CROSSING NRL IN THE SAN LUIS VALLEY (1962-1974)

Stream	Year Surveyed	Number of Fishermen Contacted	Total Hours Fished	Catch	Composition
Cotton Creek	1973	5	25	25	100% brook trout
	1974	9	34	15	80% rainbow trout 10% cutthroat trout 10% brook trout
Ford Creek	1974	1	1	5	100% brook trout
La Jara Creek	1962	17	67	120	64% rainbow trout 11% brown trout 25% brook trout
	1966-1971	23	59	68	+80% rainbow trout
	1973	1	6	2	50% rainbow trout 50% brook trout
	1974	17	38	27	67% rainbow trout 33% brook trout
Rio Grande (Monte Vista to state line)	1973	21	30	16	50% northern pike 38% catfish 6% rainbow trout 6% brown trout
	1974	35	39	16	82% northern pike 12% brown trout 6% rainbow trout
Sheep Creek	1969	1	2	5	80% brook trout 20% rainbow trout
	1970	37	80	125	51% rainbow trout 46% brook trout 37% brown trout
	1971	27	106	140	84% brook trout 14% rainbow trout 1% brown trout

high. However, no survey of the biota of existing springs and seeps in the valley has been made to date, and more specific information is therefore lacking.

Riparian Community

The riparian community is perhaps the most fragile and least understood plant association presently being affected by grazing in the San Luis Valley. There is a delicate balance between the hydrophillic plants, their water source, and the animal populations affiliated with them. As long as water is constantly available, plants such as cottonwood (*Populus*), willow (*Salix*), alder (*Alnus*), aspen (*Populus*), and currant (*Ribes*) can extend out onto the alluvial plain, supported by the stream and in turn supporting a unique microhabitat beneath them (figure II-28). These plants provide niches for invertebrates, amphibians, mammals, fish, and the myriad of other organisms that make up the riparian community by (1) forming shade, cover, and moisture; (2) aerating the soil; and (3) affecting the stream itself.

Some specific ways the riparian and aquatic communities interact are as follows.

1. Riparian plants buffer water temperatures and light penetration. Minckley (1956) found that maximum light in a small, natural stream occurred in spring and autumn months. During the summer, leaves of stream-side plants shade the light to winter levels. This shading in turn affects the singularly important process of photosynthesis. Reducing light levels also reduces summer water temperatures, allowing cold-water organisms from higher elevations to spread down into the lower riparian niches.

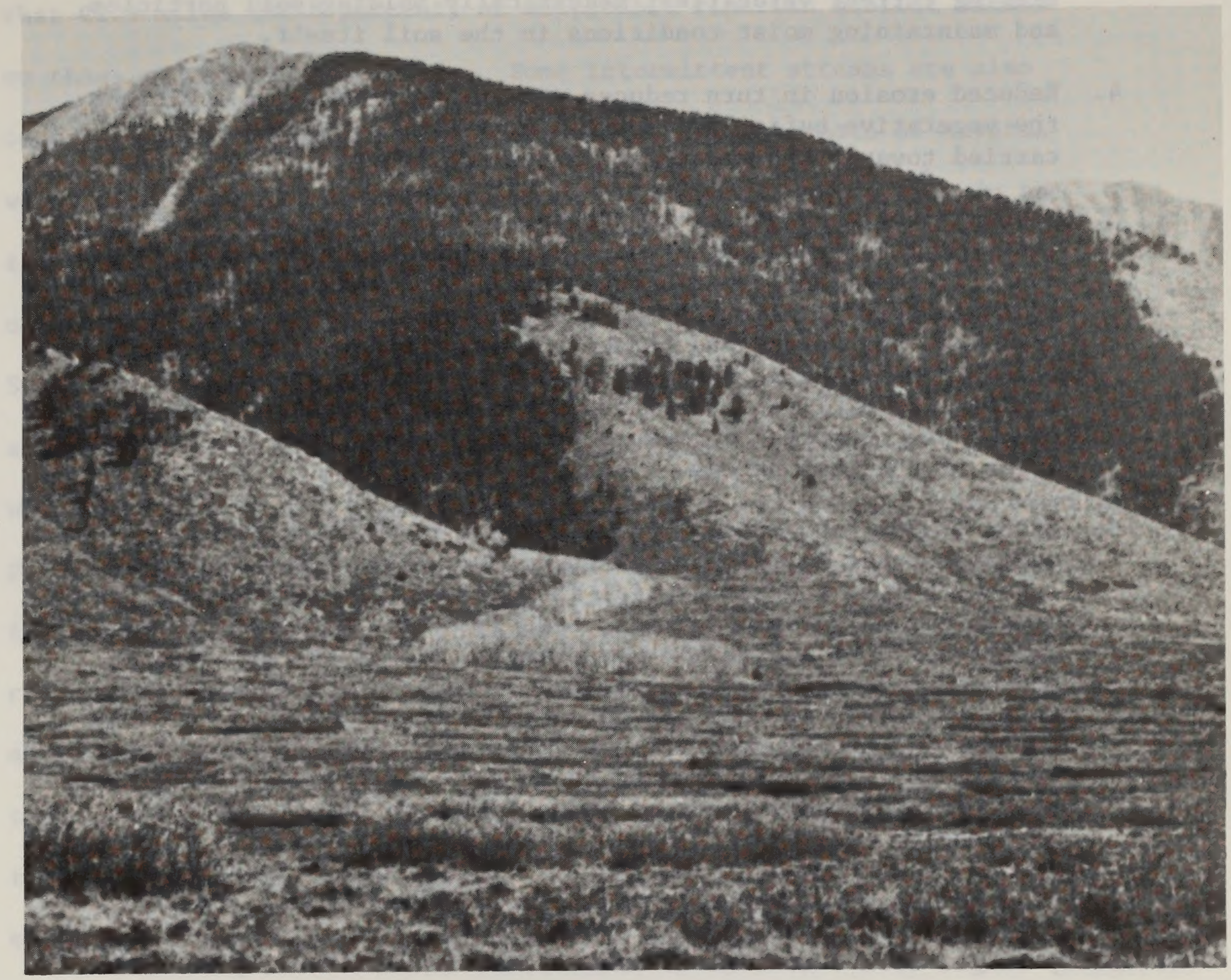

Figure II-28. Riparian habitat spreading down onto alluvial fan near Nieland Creek

2. Water flow is regulated by riparian vegetation in several ways During peak flows, the plants tend to hold back flood waters, reducing current rates and allowing greater percolation. During low flow periods, however, the water demand of these phreatophytes reduces water levels even further, sometimes completely eliminating surface flow.

3. Riparian vegetation greatly reduces stream-bank erosion by slowing current velocities, mechanically holding soil particles, and maintaining moist conditions in the soil itself.

4. Reduced erosion in turn reduces stream siltation. In addition, the vegetative buffer strip traps many fine particles being carried towards the stream via sheet erosion.

5. Boussu (1954) and Platts and Rountree (1972) consider the most beneficial characteristics of stream-side vegetation to be the cover it furnishes aquatic organisms. Stabilized banks provide hiding places for fish, as do overhanging shrubs. Trees that fall into and across the stream act as natural weirs, digging into and rearranging the substrate into more diverse microhabitats. Phillips (1931) found that stream reaches covered with brush supported a greater benthic biomass than did cleared areas of the same stream.

6. Hynes (1970) and McConnell (1973) consider allochthonous materials that fall into the stream as a major energy source. Leaves, twigs, and terrestrial insects all pass through the intestines of aquatic animals, sometimes several times in the energy cycle of a stream. For example, a leaf may be eaten by an aquatic insect or be decomposed by bacteria or fungi. Any of these organisms in turn can be eaten by higher animals, cycling the energy through several trophic levels. Some authors (Hynes 1970, Cooper 1956) have noted trout food often exceeds 50 percent terrestrial insects, most of which fall into the stream from overhanging vegetation.

A rating of present riparian conditions on permanent NRL streams in the valley ranges from excellent to nonexistent (table II-32, p.II-138). Criteria for these ratings are based upon existing community status and its adjustment to present habitat conditions rather than the individual habitat conditions themselves (see table II-33, pp.II-139 f.). Of the 33 miles of permanent streams surveyed on NRL in the valley, 3.0 miles (9.1 percent) are in good condition, 6 miles (18.2 percent) are in fair condition, 10.4 miles (31.5 percent) are in poor condition, and 0.5 miles are in non-existent condition (tables II-32 and II-33). If acceptable conditions include both excellent and good categories, expansion of table II-32 to the total 47 miles of permanent streams on NRL indicates that 22.9 miles (48.8 percent) of acceptable riparian habitat exists on these streams in the valley. Some intermittent streams are also capable of supporting riparian habitats because the roots of several woody plants can tap underground water if it continues to flow in the streambed beneath the surface. Several examples of "dry" riparian communities exist in the valley, including Cottonwood, Peterson, and Swidinski creeks on NRL. There is a total of 183.4 miles of intermittent streams in the valley (table II-15, pp.II-47 f.), perhaps 20 percent of which has an associated plant community made up of at least some riparian plant species. If the 48.8 percent excellent-to-good figure calculated for permanent streams is used on this 36.7 miles of intermittent stream riparian habitat, an estimate of 18 miles of acceptable riparian habitat on intermittent streams is derived. Thus, a potential figure for the total number of miles of acceptable riparian habitat in the valley adds up to an estimated 40.8 miles (22.9 + 18.0); and an overall total of about 84 miles (47.0 + 36.7) of identifiable riparian habitat can be found along the 230 miles of permanent and intermittent streams.

Examples of several permanent streams supporting diverse riparian communities are Tuttle, Sheep, Middle Garner, Cotton, and Alder creeks. Less diverse, although for the most part stable, conditions are found on the middle reach of Ford, Lower Garner, and Hat Springs creeks. Some of these stabilities result from a rocky substrate of heavy grass cover rather than traditional riparian plants. With the exception of Kerber Creek, which has no aquatic or riparian communities on NRL due to pollution from mining operations, one of the poorest permanent stream riparian communities on NRL in the valley is lower Ford Creek, where the streamside vegetation often consists solely of rabbitbrush and unstable eroding banks are commonplace. By far, the worst riparian conditions are found below permanent waters on intermittent streams like Baxter, Biedell, Squaw, and Antelope creeks and Laughlin Gulch. Of course, some of these "streams" may never have supported a riparian community because of a lack of water, but others once did and have been entirely destroyed, directly or indirectly, by grazing. Indirect changes include stream diversion to water pastures (as is presently occurring on Cross and Sheep creeks) or "improving" and rerouting spring flow (like Squaw Creek Spring).

A summary of present aquatic and riparian conditions on NRL in the San Luis Valley shows a continuing decline on most watersheds. Influencing factors have improved in the past 30 years, especially from the highly exploitive period in the late 1800s and early 1900s, but not to the point where good riparian communities exist on a majority of the streams. Less than 16 percent of those stream miles listed in table II-32 (p.II-138) are presently supporting a completely healthy riparian community; an even smaller percentage of the streams have fisheries capable of a sustained harvest.

Controls and Constraints

Ranchers had free and unlimited use of unreserved, unappropriated public lands until the Taylor Grazing Act was enacted in 1934. The primary purpose of this act is to stop injury to the public rangelands through overgrazing. In addition, the act states that tenure to public lands cannot be acquired through preemptive means prior to classification of the land for the intended purpose by the Secretary of the Interior. The lands remain open, however, for the staking of mining claims and for public hunting, fishing, camping, and other outdoor recreation.

Congress enacted the Classification and Multiple Use Act (Public Law 88-607) September 19, 1964, which authorizes and directs the Secretary of the Interior to classify NRL for disposal or for retention for management under principles of multiple use and to produce a sustained yield of products and services. All "best-blocked" NRL in Saguache County was classified July 16, 1968, for retention for multiple-use management under case serial number Colorado-3886. This classification segregates all of the involved lands from appropriation under the agricultural land laws (43 U.S.C. Chapters 7 and 9; 25 U.S.C. 334) and from public sale under Section 2455 of the Revised Statutes (43 U.S.C. 1171). The lands remain open to all other applicable forms of appropriation, including the general mining and mineral leasing laws.

The National Environmental Policy Act of 1969 (Public Law 91-190); Executive Order 11514 (35 F.R. 4247) enacted on March 5, 1970; guidelines by the Council on Environmental Quality (36 F.R. 1389) of January 28, 1971; and BLM Manuals 1791, 1792, and 2031 provide the authority, directives, and guidelines for enhancing and protecting the quality of the environment.

Local county governments have been authorized and instructed by the State of Colorado general assembly "to plan for and regulate the use of land within their respective jurisdictions" (Chapter 106 Colorado Revised Statutes, as amended). Of the four counties in which NRL lie, Saguache and Conejos counties presently are without formal zoning regulations. Both Rio Grande County and Alamosa County have adopted formal zoning regulations. Alamosa County adopted revised zoning regulations January 8, 1975; and Rio Grande County is presently in the process of updating existing zoning regulations.

Both county zoning regulations presently in effect regulate use of all rural lands in each respective county "excluding any lands owned and administered by the Federal Government." Accordingly, NRL in the San Luis Valley are not subject to any county zoning ordinances that presently exist. However, intermingled privately owned lands in Alamosa and Rio Grande counties are zoned Rural District (RU), permitting general farming and ranching, management and production of forestry products and natural wildlife habitats and reserves, noncommercial recreational facilities not operated for profit, and one unit farm and ranch dwelling and accessory buildings and uses. Other related uses (conditional uses) may or may not be appropriate depending on location, nature of proposed use, and other factors. The purpose of the conditional-use designations is to provide review of such uses to assure compatability with other permitted uses.

In summary, no significant controls or constraints, other than those necessary to manage the lands under the multiple-use concept, burden the lands involved in the proposed action.

Recreation

The "Regional Comprehensive Plan" (San Luis Valley Council of Governments 1974) indicates that NRL comprise 20.58 percent of the land available for recreation uses in the San Luis Valley (see table II-37). Table II-38 shows the annual recreation use for the major activities occurring on NRL.

The data used to compile the number of visitor days in table II-38 came from the Unit Resource Analysis (U.S. Department of the Interior 1975a) and the 1974 Big-Game Harvest Statistics (Colorado Division of Wildlife). The data used to figure the activity days are percentages of projected-use figures resulting from a survey conducted by the Colorado State Planning Commission (1972). In order to relate the statistical projections to use on NRL, the following assumption was made: the use indicated by the Colorado State Planning Commission (1972) occurred evenly on the available recreational land in the San Luis Valley.

This assumption allowed using the percentage of available recreation lands found in table II-38 to determine the estimated activity days of recreation use occurring on NRL. The result is an approximation that may be higher than the actual use; however, it is the best estimate currently available for the activities being considered.

TABLE II-37. DISTRIBUTION OF LAND OF RECREATIONAL VALUE BY ADMINISTERING AGENCY

Agency	Acres	Percent of Total
Forest Service	2,106,067	69.75
National Park Service	35,764	1.18
Bureau of Land Management	621,414*	20.58**
Bureau of Sport, Fisheries, and Wildlife	22,733	0.75
Other Federal Agencies	22,733	0.75
Federal totals	2,808,711	93.03
Division of Game, Fish, and Parks	15,145	0.50
Department of Highways	13	--
State Historical Society	978	0.03
Other State Agencies	7	--
State totals	16,143	0.53
County	713	0.02
City	902	0.03
School Board	109	0.01
Local totals	1,724	0.06
Quasi-public	1,157	0.04
Private	191,537	6.34
Private totals	192,694	6.38
Total recreation land	3,019,272 acres	100.00

* This figure includes 105,043 acres of NRL in the Montrose District. Since the San Luis Resource Area boundary does not coincide with Colorado State planning area boundaries, this figure and the 20.58 percent figure are applicable only to Colorado State Planning data.

** This figure (20.58 percent) was used to determine the estimated activity days of recreation use occurring on NRL. The result is an approximation that may be higher than the actual use; however, it is the best estimate currently available for the activities being considered.

SOURCE: San Luis Council of Governments. 1974 Regional Comprehensive Plan, Vol. 1. Alamosa, Colorado, p. 137.

TABLE II-38. PRIMARY RECREATION ACTIVITIES
OCCURRING ON NATIONAL RESOURCE LANDS
(1974 data)

Activity	Annual Use on NRL
Driving for pleasure	264,663 Activity Days a/
Four-wheel driving and motorcycling	118,049 Activity Days
Hiking	114,348 Activity Days
Any type of hunting	64,423 Activity Days
Sledding and snowmobiling	24,436 Activity Days
Fishing	984.5 Visitor Days b/
Use of Blanca WHMA c/	409 Visitor Days
Collecting	est. 300 Visitor Days

a/ One "Activity Day" equals one recreation visit--length is variable. A single day's recreation experience can produce numerous Activity Days. For example, if one is hunting and takes a four-wheel drive, tent, and horses and does some hiking, Activity Days of use will be generated in five separate categories. Thus, Activity Days represent use pressure in each activity by the number of users and not the length of use.

b/ One "Visitor Day" equals twelve visitor-hours of use. This implies that one or more visitors participated in an activity for an aggregate total of twelve hours. Two people using an area for six hours each or 24 people using an area for one-half hour each would constitute one Visitor Day. An "average-length-of-use" factor for each activity would be required to convert Visitor Days to Activity Days or vice versa; but such data were not located.

c/ Blanca Wildlife Habitat Management Area

SOURCE: 1974 Interim Colorado Comprehensive Outdoor Recreation Plan Data, the BLM San Luis Valley Unit Resource Analysis, and the Colorado Division of Wildlife.

Recreation use of NRL in the San Luis Valley is limited to a few activities that can occur on undeveloped land. These activities include driving for pleasure, four-wheel driving and motorcycling, hiking, hunting, sledding and snowmobiling, fishing, using the Blanca Wildlife Management Area, and collecting (e.g., pinyon nuts and rocks).

Driving for Pleasure (Sight-seeing)

Driving for pleasure is one of the most popular leisure time activities in the United States. It is most often a family activity that occurs on paved or improved dirt roads. The majority of the roads that are most likely to be used for this activity are not on NRL. Because of the nature of the San Luis Valley, however, NRL can be seen from any road outside of national forest lands. In addition, several county roads and some portions of state and federal highways do cross NRL. In these cases, the recreationists have a much closer view of NRL. The views available to sight-seers are discussed in the aesthetics section of this chapter.

Four-Wheel Drive and Motorcycle Use

Operating four-wheel drive vehicles and motorcycles is very popular in the San Luis Valley. Although a few four-wheel drive organizations exist in the valley, the majority of use that occurs is by individuals with no club affiliations. Most four-wheel drive and motorcycle use in this area is for the purpose of sight-seeing, picnicking, hunting, or other complementary activities. The use of the vehicles is a large part of the recreation experience, however it is usually a means rather than an end in itself. "Challenging the terrain" is not the dominant or even a major characteristic of these primitive-road, jeep-trail, or off-road vehicle users.

Both the Rio Grande National Forest and NRL provide a network of primitive roads and jeep trails for these users. Most of the use occurs on national forest lands since such lands provide a greater number of opportunities for complementary activities in a more scenic setting than can be found on NRL.

All of the Great Sand Dunes National Monument and most private lands are closed to off-road use. Although the Rio Grande National Forest provides a full spectrum of opportunities for recreational use of vehicles, off-road opportunities are limited (O'Roark 1976). NRL were traditionally open for such use, unless otherwise specified, until a BLM loss in a court suit resulted in the Bureau's ORV regulations being dropped and new ones being drafted (which are not yet completed).

Most off-road use in the San Luis Valley occurs on NRL and national forest lands. Although believed to be relatively low (depending upon the definition of a road), the actual level of off-road use and relative roles of NRL and national forest lands are not known.

Hiking Across Open Country

The majority of hiking use is probably associated with hunting, fishing, and collecting pinyon nuts and rocks. Few features on NRL are destination points and no areas are known to be popular for hiking use as a self-fulfilling activity. Increased interest in the use of NRL for this activity is not anticipated.

Any Type of Hunting

Hunting opportunities are probably the greatest recreation attractions on NRL in the San Luis Valley. Some activities listed in this section are considered separately but actually result from hunting. These complementary activities are four-wheel drive use, motorcycle use, plus hiking, camping, and picnicking in open country. The data in table II-37 (p.II-155) imply that hunting on NRL may account for about half of the four-wheel drive, motorcycle, and open-country hiking use and virtually all of the open-country camping and picnicking use indicated in the 1974 Interim Colorado Comprehensive Outdoor Recreation Plan (Colorado State Planning Commission).

Big-game hunting is probably the major hunting activity that occurs on NRL. The 1974 Colorado Big-Game Harvest (Colorado Division of Wildlife 1974) data were used to determine that approximately 1,835 Visitor Days of hunting use occurred on NRL during 1974.

The main contribution of NRL to hunting is the provision of habitat to big-game species during off-season periods. It is estimated that the 695 mule deer, 374 elk, 46 antelope, and 4 bighorn sheep killed by hunters annually can be attributed to habitat provided by NRL. This means that 11,871 Visitor Days of annual big-game hunting use is attributable to habitat provided by NRL.

Sledding and Snowmobiling

The estimated use occurring on NRL (table II-37, p.II-155) is probably too high for sledding and snowmobiling. These activities commonly occur on NRL on the west side of Chiquita Peak and near the top of Poncha Pass. During heavy snow years, use also occurs in the area between Ra Jadero Canyon and La Jara Canyon. The vast majority of snowmobiling and sledding occurs on the national forest lands where good snow can be expected. Snowmobiling and sledding are activities that are generally ends and not means. In other words, the vehicles are used for the pleasure of operation rather than as a means of reaching a different goal or enabling participation in an associated activity.

Fishing

Fishing is extremely limited on NRL in the San Luis Valley due to the limited number of fishing streams crossing the land. A list of the streams that cross NRL and provide fishing opportunities are given in table II-36 (p.II-146). There are no outstanding fishing opportunities on NRL. A good deal of the fishing opportunities available are on private land; however, the majority of the available resources for this activity are on the Rio Grande National Forest.

Use of Blanca Wildlife Habitat Management Area

The Blanca Wildlife Habitat Management Area (WHMA) is chiefly used for waterfowl hunting and viewing, some fishing, ORV use, and illegal arrowhead hunting. Present management direction is to eliminate ORV use and discourage the illegal practice of arrowhead hunting on NRL.

There were approximately 409 Visitor Days of sanctioned use in the area, and use has been steadily increasing since the area opened. No formal recreation facilities exist in the area; however, minimal development of roads, parking areas, and toilet facilities are scheduled for construction. Use of the area is expected to continue increasing.

Collecting

Other than the illegal collection of Indian artifacts, NRL in the San Luis Valley offers little opportunity to the collecting user. Pinyon-nut collecting and some rock collecting occur on NRL, but their extent is believed to be very limited.

Agriculture (non-grazing)

Commercial agriculture is by far the most important industry in the San Luis Valley. The valley does not depend on any one segment of the industry but is quite well-balanced in animal and crop production, considering its size and environmental handicaps. Sheep and cattle forage throughout the lower to intermediate areas of the valley during most months of the year, utilizing the more mountainous national forest lands during the summer. Crop production on the other hand is confined to the more level portions of the fertile valley floor.

With a mean average precipitation of only 7 inches per year, natural rainfall is inadequate for dryland farming practices and all crops grown need irrigation water. Irrigation farming started in the valley in the 1880s. Heavy applications of irrigation water and poor soil drainage characteristics raised the underground water level above acceptable limits in the lowland areas. Alkaline conditions forced a general movement westward onto the alluvial fans where soils are naturally well-drained.

Surface water is the principal source of water for irrigation in the San Luis Valley, although use of subsurface water has increased noticeably in the last two decades. From 1961 through 1970, water diverted from streams and withdrawn from wells has averaged about 1,830,000 acre-feet per year. About 86 percent of the water entering the valley is consumed within the valley by evapotranspiration during an average year, with about 1.4 million acre-feet used by crops and 1 million acre-feet by "non-beneficial" (i.e., no monetary return) vegetation. The primary method of application is by gravity flow systems that utilize water from the Rio Grande and its tributaries, natural artesian wells, and/or deep pump wells. It is often necessary to employ a combination of two or all three of these sources as seasonal runoff fluctuates with annual snowmelt. Stream water diminishes rapidly after mid-July, and late crops such as potatoes and hay require irrigation from stored water. Recent years have seen a marked increase in the use of sprinkler systems throughout the valley.

Most of the land that can be irrigated is in the central portion of the San Luis Valley in Conejos, Alamosa, and Rio Grande counties, and southwestern Saguache County. Soils here are deep and fertile, having been formed from an ancient lake bed.

Table II-39 shows acreages and cash value of cultivated crops in the San Luis Valley. Potatoes are the main cash crop grown, accounting for almost 40 percent of the total cash value of $30.5 million. Almost

TABLE II-39. PRINCIPAL CROP HARVESTED BY ACRES AND CASH VALUE (1974)

Crop	Acres Harvested	Dollar Value
Wheat - winter	400	$ 28,800
Corn - grain	400	32,000
Barley	85,000	7,882,000
Sorghum for grain	70	6,500
Oats	7,200	267,300
Hay - all	184,000	9,911,800
Corn - silage	600	108,900
Wheat - spring	2,200	221,100
Potatoes (1970)	36,100	12,117,000
Commercial vegetables	2,000	not available
Totals	317,970 acres	$30,575,400

60 percent (184,000 acres) of all irrigated cropland is devoted to alfalfa or native hay production. All irrigated crops grown in the San Luis Valley during 1972 produced a cash value in excess of $30.5 million.

Livestock Grazing

After years of summer grazing by small flocks of sheep in the early 1800s, permanent livestock production was established in the San Luis Valley in about 1842. Settlement and ranching expanded rapidly in the second half of the 19th century, with sheep use predominant in the lower half of the valley and cattle and sheep grazing about equal in the upper or northern part of the valley.

Experiencing severe winter losses, most ranchers developed the use pattern that exists today: moving livestock from lower private lands in late spring to higher public lands (NRL and national forest lands) for the summer, then moving the livestock onto NRL in the late summer and fall, and subsequently back onto private lands before winter to utilize regrowth on hay fields and hay as the primary sources of roughage (forage).

During the early 1900s, drought and overgrazing combined with a lack-of-use regulations or supervision caused the condition of the range to decline. Following the enactment of the Taylor Grazing Act in 1934, the Grazing Service, with the help of district advisory boards, made specific allocations of public range to local livestock operators.

In 1941, Grazing District #8 was established to administer domestic livestock grazing on public domain in the San Luis Valley. During the period from 1941 to 1943, range adjudication work--the apportionment of grazing use on public range among eligible applicants--was accomplished. Individual or common allotments were established for the most part, the allowable use rates were excessive and the ranges continued to deteriorate. During the following several years the Grazing Service and later the BLM mainly issued licenses and permits and solved allotment boundary problems. Some downward adjustments in grazing use were made, however, on very critical areas and on areas where the operators cooperated.

In the mid-1950s, the need for more appropriate stocking rates for individual allotments became obvious. As a result, range surveys were initiated on several grazing units in order to determine proper stocking rates for the various allotments. After these surveys were completed, stocking rates were reduced on most allotments. Many of these reductions were fairly drastic, ranging from 50 to 60 percent. Surveys continued intermittently through 1963, and reductions continued to be imposed. In the early 1960s some of the original surveys were rechecked, often resulting in additional reductions.

During the past decade, the BLM management thrust has been directed toward intensifying range supervision and adjusting class of livestock or season of use in consideration of other resource values and needs, which has included the cancelling of grazing privileges and setting aside of areas for wildlife. Ten allotment management plans have been developed and implemented and the remaining 155 management units are presently managed less intensively.

Recent data indicate that total recognized qualifications totaled 42,999 AUMs annually while 1975 licensed use was 34,995 AUMs (United States Department of the Interior 1975a). However, BLM Annual Grazing Statistics indicate that domestic livestock use was 39,699 AUMs in 1961, with 1973 and 1974 actual use ranging between 30,000 and 33,000 AUMs. This decrease in actual use of about 7,000 AUMs annually, between 1961 and the present, reflects the impacts of the range inventories and subsequent reductions. (Some voluntary non-use has occurred since desired changes in class of livestock, conversion from sheep to cattle, have not yet been approved by BLM.)

In 1974 there were an estimated 152,000 beef cattle and calves in the San Luis Valley (Colorado Department of Agriculture 1975). This figure represents an increase of 37.7 percent over the number in 1970. Prior to that time, the number of beef cattle and calves in the valley had remained relatively constant. (Between the 1964 and 1974 Agricultural Censuses, the increase was only 0.8 percent.) In the same year (1974), there were 84,000 stock sheep and lambs, representing a decrease of 42.8 percent since 1970. In the previous five-year interval (1964-1969), the number of stock sheep and lambs had decreased by 10.7 percent. The 1974 data reflect the lowest number of stock sheep and lambs in Colorado, since such data were first collected in 1920 and document a continuing reduction in sheep numbers in the San Luis Valley. It is expected that sheep numbers will continue to decline at a reduced rate.

Data for 1974 and 1975 suggest that the number of beef cattle and calves in Colorado has leveled-off with some recent declines; however, in the San Luis Valley, while there are indications of a leveling-off, no decline in beef cattle numbers has occurred. A U.S. Department of Agriculture study projects national increases in the total demand for AUMs of grazing from 40 to 99 percent between 1970 and 2000 (U.S. Department of Agriculture 1975a). Colorado livestock statistics suggest that increases in the demand for AUMs in the San Luis Valley may have already approached the existing carrying capacity of the range resource there.

The 1974 beef cattle and calves and stock sheep inventory shows a total of 158,920 range livestock related animal units. The number of animal units of livestock is still increasing since the beef cattle inventory has expanded more rapidly than the sheep inventory has decreased. Thus, the 1974 animal unit inventory requires 1,907,040 AUMs of forage and supplements annually.

Many of these same trends apply to grazing use that has been taking place on NRL. The downward trend in sheep numbers characterizes what has been happening on NRL; many operators have converted from sheep to cattle in the past ten years. Requests for these conversions have greatly accelerated in the past four to five years. Because of this change in class of livestock, the number of cattle using NRL has also increased. However, the rate of increase does not approach that for the San Luis Valley as a whole. Much of this accelerated increase in cattle numbers for the valley must be attributed to private ranches and farms where no NRL permits are involved.

At 35,000 AUMs of forage, the NRL contribution of the total annual regional requirement is 1.8 percent, while 33,000 AUMs annually represent only about 1.7 percent of the amount required annually by the region's range livestock industry.

In 1969, the Agricultural Census indicated that there were 621 livestock farms and ranches in the counties comprising the San Luis Valley region. In 1975, NRL provided some livestock forage to 122 operators. With the recognition that a few of the licensed users are headquartered in New Mexico and that the actual number of livestock farms and ranches is believed to have declined since 1969, it appears that NRL provide livestock forage to only about one-fourth of the range livestock operations in the valley. Thus, regionally, the contribution of BLM-licensed forage in the San Luis Valley is relatively small (less than 2 percent of annual requirements). Dependency on

BLM-licensed forage by individual operations, however, does range much higher. Also, many operators use NRL for short periods in an annual rotation beyween grazing on private lands and on national forest lands during the summer months. Loss of grazing privileges for these short periods would have impacts on these operators, even though their annual dependence on NRL is small. Operational readjustments and some minor reductions in livestock numbers would be expected.

In summary, the annual regional livestock industry dependency on BLM-licensed forage is very small, 1.8 percent or less. Individual operator seasonal and/or annual dependency ranges somewhat higher for the one-fourth of the San Luis Valley range livestock operators who use this forage. However, it appears doubtful that forage from NRL is the major source of forage for most San Luis Valley users.

Mineral Resources

The only significant mining activity currently underway in the San Luis Resource Area is at King Turquoise Mine, just east of Manassa. The mine is an open-pit operation of about two acres and has produced about $67,000 worth of turquoise. Small amounts of mineral materials, such as sand, gravel, and building stone, are removed annually from federally-owned lands throughout the valley, but most minerals come from private land. No oil nor gas production occurs in the valley; and the resource area is considered unfavorable for occurrences of petroleum.

Future geothermal exploration and development can be expected in the northern part of the valley near Mineral Hot Springs and Villa Grove--a locale of recent competitive and non-competitive leasing. Geothermal exploration and development will be similar to that of oil and gas with drill rigs, new roads, and eventually buildings and power lines.

Continued exploration along the lower slopes and foothills of NRL might turn up significant new discoveries of various metallic minerals, such as gold, silver, copper, and uranium. However, it is not possible to project when or where future development activities might occur.

Forest Resources

The productive forest area comprises 25,452 acres (see vegetative type map figure II-13, p.II-65). The forest inventory conducted in 1964 and modified by the information available from the 1974 extensive inventory indicates the San Luis Resource Area has a total volume of 39.5 million board feet (mmbf). Approximately 65 percent (25.7 mmbf) is located on marginal sites of shallow, rocky soils, low- to meduim-site class, low annual precipitation, with poor natural regeneration and poor regeneration by artificial means. Ten to fifteen percent of the timber is located on slopes adjacent to or visible from public roads and highways. Nearly half the acreage has been cut over since the early 1940s, much being high graded. Except on the better sites (55+), there has been little natural regeneration. The altitude for sawtimber species ranges from 7,800 feet to over 9,500 feet. Annual precipitation in the timbered areas averages 10 to 16 inches, with the major portion being in the form of snow. Temperatures range from mild in summer to extremely cold in winter.

Insects and Diseases

Insect damage in the San Luis Valley is negligible. The primary disease problem is dwarf mistletoe. Almost all pine stands visited during the 1974 inventory had mistletoe present. The heaviest infestation is in the Trickle Mountain area. The last large sale was made in this area as a control measure. Throughout its range in the valley, aspen is infested with Fomes Igniarius. As the aspen approach pole and sawtimber size, they become heavily infested.

Past Cutting

Table II-40 shows the volume of timber cut from 1970 to 1974. The volume is listed for the following products: sawtimber, mine props, posts, corral poles, fuel wood, and wilding.

Trespass

Only seven trespass cases are listed on the register for the past ten years. None of these were for sawlog trespass. They were cases involving firewood, posts, and poles. Suspected firewood trespass is a continuing problem throughout the area.

Access

There is no known legal access problem in the San Luis Resource Area. However, there is a physical access problem on the east side of the valley along the western slopes of the Sangre de Cristo Mountains. The timber in this area is located on the steep (in excess of 60 percent) slopes and ridges at elevations between 9,000 and 11,000 feet and in the steep canyons where road-building costs would be far in excess of the timber values involved.

TABLE II-40. VOLUMES BY PRODUCT BY CALENDAR YEAR FOR 1970-74

Year	Sawtimber (mbf)	Mine Props (linear feet)	Posts (number)	Corral Poles (linear feet)	Fuelwood (tons)	Wildings (number)	Fuelwood Free (use cords)
1970	516	4,000	-	4,800	25	50	220
1971	-	-	-	1,800	8	-	25
1972	409	-	-	-	23	-	125
1973	-	-	-	-	40	-	90
1974	-	-	-	-	10	-	50

Demand for Forest Products

Sawtimber. At present there is little or no demand for sawtimber from NRL within the San Luis Resource Area. In the past five years, less than 0.9 percent of the timber volume sold in the valley area came from NRL. The Directory of Colorado Manufacturers, 1973-1974 (University of Colorado) lists seven lumber manufacturers and two logging outfits in the San Luis Valley. These companies employ approximately 100 people. Four of these companies are actually outside the resource area but within driving distance. In the mid-sixties, there were nine sawmills and five logging contractors in the Saguache Planning Unit alone.

Posts and Poles. Because of increased prices for steel posts and fencing material, there has been a greater demand for wood posts and poles. As steel prices increase, the demand for wood posts and poles will increase.

Fuelwood. There has been a tremendous local and regional demand for firewood because of increased prices and shortages of other fuels. Because of the depressed economy in the valley, many people supplement their income by either using the wood for fuel or selling it. The greatest demand is for the pines (ponderosa and pinyon) and juniper. All species are utilized to some extent.

Christmas Trees. There has been some demand for commercial Christmas trees. This may increase as the supply on national forest lands dwindles.

Other Vegetative Products

At present, there is no great demand for other vegetative products. There have been occasional requests for pinyon nuts, boughs, and wildings. There have been only five small sales in the past three years. The primary problems are suspected trespass and trespass control.

Transportation Networks

All the types of transportation systems, except water, exist in the San Luis Valley. Two major highways serve the region: U.S. Highway 160 traverses the valley in an east-west direction and U.S. Highway 285 provides north-south service. Both highways are two-lane, paved, all-weather roads that connect the major cities and towns of the valley. Over a dozen state-maintained highways provide good access to the remaining towns and settled areas. County all-weather feeder roads provide a satisfactory network servicing the remainder of the region. The most dense road development occurs in areas of greatest economic activity and settlement. Road development in the open rangelands and mountainous areas of the valley consists of primitive roads and trails. These are often closed during bad weather and, in some instances, are barely passable under dry driving conditions.

Continental Trailway busses provide passenger and freight service to Saguache and all towns on U.S. Highway 160. The Creede Bus and Freight Line provides freight service between Alamosa, Del Norte, and Monte Vista, with service varying depending upon the season.

The Denver and Rio Grande Western (DRGW) Railroad provides the only rail freight service into the valley. With 140 miles of track, the railroad daily serves Alamosa and points west to South Fork. Passenger service was discontinued a number of years ago. A smaller line, the San Luis Central Railroad with its 12 miles of track, connects the agriculturally rich town, Center, with the DRGW Railroad and provides daily freight service.

The only regularly scheduled air passenger and freight service carrier in the San Luis Valley is provided by Frontier Airlines. Alamosa is served twice daily, with destinations of Albuquerque and Denver. Alamosa Aviation at Alamosa, Cominair Incorporated at Monte Vista, Leach Air Service at Center, and Valky Aviation Incorporated at Monte Vista provide local service in the valley. A number of small fields throughout the valley handle private planes.

Figure II-29 shows the transportation networks in the San Luis Valley.

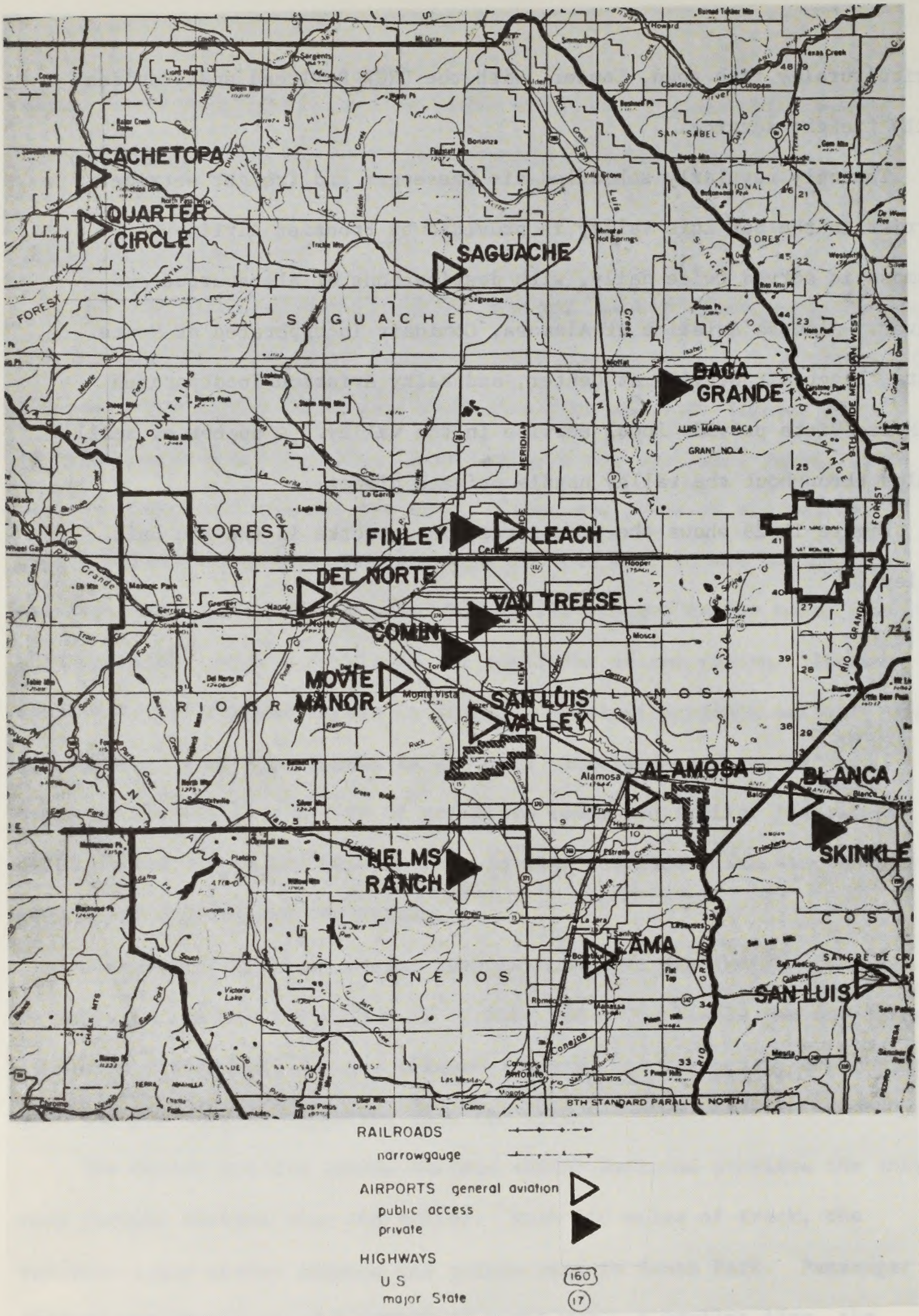

Figure II-29. San Luis Valley transportation

Archaeological Resources

The San Luis Valley is geographically situated at a midpoint separating three major prehistoric cultural zones: the Plains to the east, the Great Basin to the west, and the Southwest. As a result, the archaeological remains in the valley represent a blending of various cultural and environmental adaptations. Archaeological sites are abundant but, to date, the data have not provided enough clues for a complete archaeological reconstruction of the prehistory of the valley.

The vast majority of the San Luis Valley has not been either adequately or recently surveyed for sites. A literature search revealed that 54 sites have been recorded on or near NRL in the San Luis Valley by the University of Denver, the University of Colorado, and the Saguache Archaeological Society. Many of these sites were recorded 10 to 45 years ago and have not been examined since. Therefore, their present condition is unknown. An additional 145 sites have been inventoried by the BLM. The majority of these sites (137) were located during an intensive inventory of the Blanca Wildlife Habitat Management Area (Blanca AMP).

The San Luis Valley and surrounding mountains offered abundant animal resources to the Indians of the region. Prehistoric bison, antelope, deer, various small mammals, fish, and fowl abounded--animals that attracted hunters to the valley. The archaeological remains provide evidence of approximately 12,000 years of occupation by aboriginal hunters. In general, the majority of sites represent short-term campsites which were occupied during the summer months.

For some parts of the valley, the hostile climate impeded efficient use during the winter months. The archaeological evidence from the Sand Dunes area, however, reflects continuous year-round habitation throughout much of the prehistoric period. As long as water and game were available, hunters could stay in the dunes area. Protection from the elements was provided by many topographical features. In addition to indicating the presence of permanent inhabitants, archaeological and historical evidence also shows that many hunting bands from the surrounding areas came to the valley on a seasonal basis. In general, the archaeology of the San Luis Valley provides prolific data concerning the cultural and economic practices of the aboriginal hunters of south-central Colorado.

Archaeologically, the San Luis Valley area may be divided into three areas: the Saguache area, Sand Dunes/Dry Lakes area, and Rio Grande area (see figure II-30). Each of the areas is described in terms of the types of sites that are currently known and those which may be expected to occur. A more detailed description of known Indian occupation from about 12,000 B.P. (before present) to modern times may be found in the report "Archaeological Resources on National Resource Land in the San Luis Valley" (Greiser 1975a).

A great quantity of sites in the valley are situated on NRL. Local collectors excavate the sites in spite of the federal laws forbidding such activity. Off-road vehicles and new mining roads have made more areas accessible and subject to looting. Present BLM personnel levels and lack of enforcement authority have made protective management an impossibility. As a result, much valuable archaeological data have been destroyed.

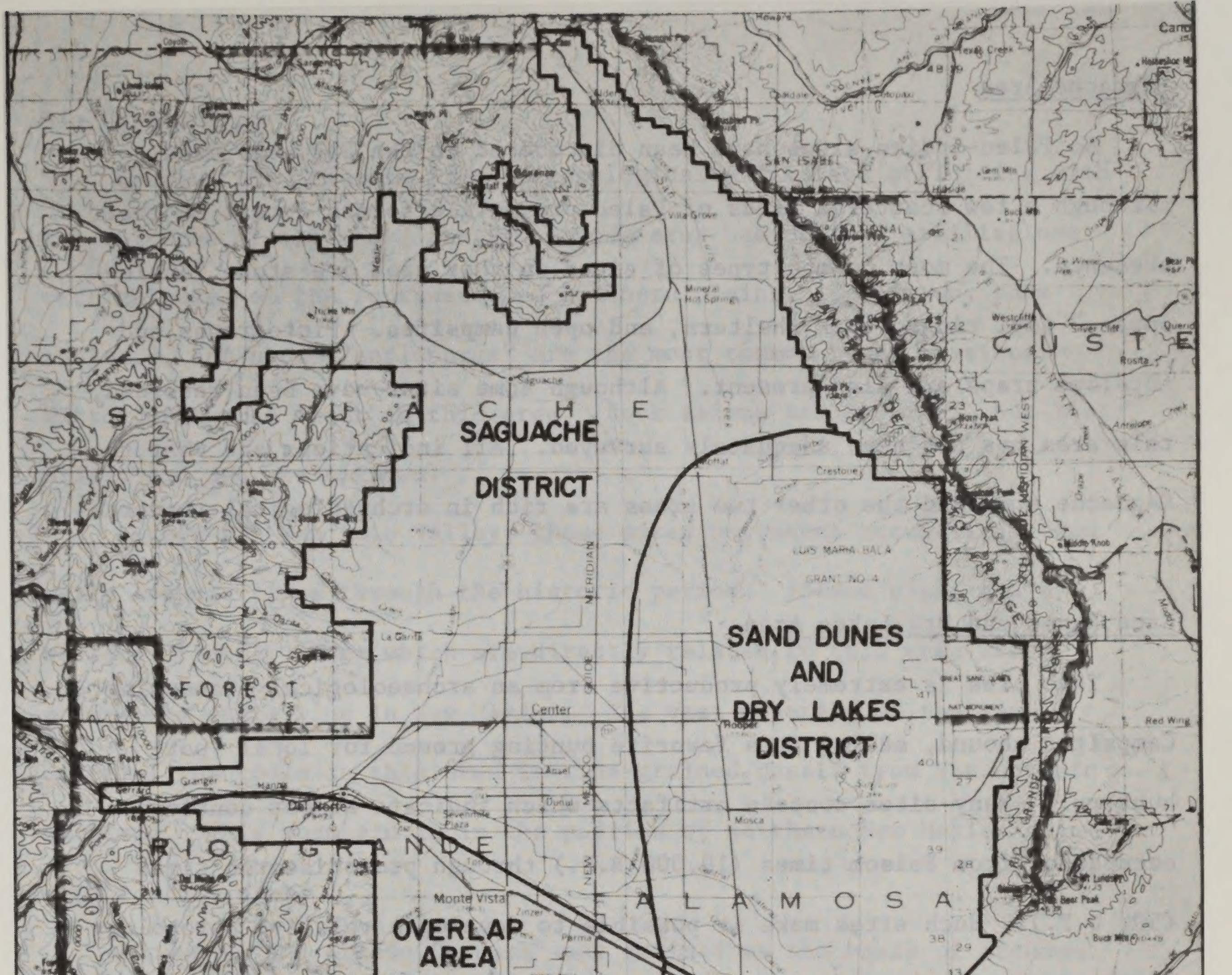

Figure II-30. Archaeological areas in the San Luis Valley

Saguache Area

No Paleo-Indian sites have been discovered in the Saguache area, although a few scattered finds of Paleo-projectile points attest to their presence. The most common types of sites in this area are stone "enclosures," tipi rings, rock shelters, and open campsites. Pictographs and antelope traps are also present. Although some sites have been recorded, this area has not been adequately surveyed. All indications are that the Saguache area and the other two areas are rich in archaeological resources.

Sand Dunes and Dry Lakes Area

This area is extremely productive from an archaeological standpoint. Campsites abound, making it a favorite hunting ground for local "pothunters." Many sites contain artifacts which indicate almost continuous occupation from Folsom times (10,000 B.P.) through protohistoric times (500 B.P.). Such sites make it possible to develop a relative chronology of the occupations.

Mammoth remains have been located throughout this area. Some of these sites are in association with the tools of Paleo Indians (Greiser 1975b).

In a survey of the Blanca WHMA, 141 sites were located. Such findings could possibly make this area eligible for inclusion in the National Register of Historic Places (Dick 1974). The Blanca WHMA is presently being developed as an area for waterfowl production. In addition, the area has been heavily used by surface-collecting "pothunters." To date, this destructive and illegal activity has not been stopped.

Rio Grande Area

Whereas the Saguache area archaeologically displays affinities with the cultures of the west, the Rio Grande area has obvious affiliations with cultures of the southwest and southern plains. Campsites, rock shelters, and stone "enclosures" are the most common types of sites. Pictographs also occur in this area. Rock cairns are abundant, but their origin and age are unknown.

Within the San Luis Valley, these sites represent occupations from early Archaic times through the historic period. Folsom sites and a variety of other sites which are directly related to this area are across the state line in New Mexico. The vast majority of the raw material for tools in this area is fine-grained basalt from San Antonio Mountain. This mountain is in the portion of northern New Mexico adjacent to this area.

Renaud's "Rio Grande Culture" was defined on the basis of archaeological reconnaissance work done in this district (Greiser 1975a). Little work has been done in this area since the early 1940s.

The one site which has National Register Status in this area is the King Turquoise Mine. This mine contains evidence of exploitation by prehistoric and historic Indians and by Spanish settlers. Recent mining of this turquoise may be responsible for the destruction of valuable archaeological resources.

Historical Resources

The visible historical remains in the San Luis Valley consist chiefly of abandoned buildings, railroad grades, graves, cemeteries, mines, and roads. Only those historical sites that might be impacted by the proposed action are described in this section. Table II-41, however, identifies all of the sites that were surveyed by BLM in the valley, listing their number, principal feature, integrity and condition status, historical significance, size, and ownership or management status. The following sites were deemed possible areas that could be impacted by the proposal.

Taos Valley Ranch. Site Number 1045 on Twin Lakes Allotment. This ranch is on private land but is directly adjacent to NRL range. The site consists of a wooden ranch house, a windmill, a garage, a water tank, and a corral with the remains of a barn. Most of the structure is built of wood. The site is of local historical significance since it relates to the nearby Taos Valley Canal Number 2.

Rock Cabins. Site Number 1046 on Twin Lakes Allotment. These rock and sod cabins are located south of Cove Lake and were built to house the workers hired to build the Taos Valley Canal. The cabins were also used to house labor for the nearby ranch. They are made of rocks with sod roofs held up by poles. The structures are on private land directly adjacent to NRL. Since these structures are unique to the area and provide physical history of the Taos Valley Canal, they are of local historical importance.

Rock Cabin. Site Number 1043 on Pinon Hills Allotment. This cabin is located in open-range country on NRL. It is made of rocks

TABLE II-41. HISTORICAL SITES IN THE SAN LUIS RESOURCE AREA

Name of Site	Site Number	Principal Site Feature	Integrity a/	Condition b/	Historical Significance c/	Physical Size (in acres)	Ownership or Management
Canal	1037	Canal remains	Poor	Poor	L	10.0	BLM
Gravesite	1038	Two graves	Poor	Poor	L	1.0	BLM
Gomez, Colorado	1039	Townsite	Fair	Good	L	10.0	Private/BLM adjacent
Cumbres Pass Railway	1040	Railbed	Good	Good	N, S, L	10.0	BLM (on N.R.) d/
La Sauses Cemetery	1041	Cemetery	Good	Fair	L	15.0	BLM
Pike's Stockade	1042	Fort	Good	Good	N, S, L	5.0	State of Colo. (on N.R.)
Cabin	1043	Cabin	Fair	Poor	L	1.0	BLM
Taos Valley Canal #2	1044	Canal	Good	Fair	L	7.5	BLM
Ranch (Taos Valley)	1045	Ranch	Good	Fair	L	10.0	Private/BLM adjacent
Rock Cabins	1046	Cabins	Good	Fair	L	10.0	Private/BLM adjacent
Spanish Cross	1047	Cross	Good	Good	L	1.0	BLM
King Turquoise Mine	1048	Mine	Good	Good	S, L	40.0	BLM
Liberty, Colorado	1049	Townsite	Good	Fair	S, L	35.0	Private/BLM adjacent
Cemetery at Tellurium	1050	Cemetery	Poor	Poor	L	1.0	Private/BLM adjacent
Becker Cemetery	1051	Cemetery	Fair	Good	L	3.0	Federal Wildlife
Rock Creek Cabins	1052	Townsite	Good	Fair	L	25.0	Private/BLM adjacent
Rock Creek Cemetery	1053	Cemetery	Fair	Fair	L	10.0	Private/BLM adjacent
Jacks Creek Mine	1054	Mine	Fair	Good	L	17.0	Private/BLM adjacent
Cabin Draw Cabin	1055	Cabin	Good	Fair	L	1.0	BLM
Ute Pass Road	1056	Road	Good	Fair	S, L	5.0	BLM and USFS
La Garita Wagon Ruts	1057	Road	Fair	Good	L	2.0	BLM
La Garita Cemetery	1058	Cemetery	Poor	Fair	L	2.0	Private/BLM adjacent
Poncha Pass Railway	1059	Railbed	Fair	Poor	S, L	13.0	BLM
Bonanza, Colorado	1060	Cemetery	Fair	Fair	L	10.0	Private/BLM adjacent
Sedgwick, Colorado	1061	Townsite	Poor	Poor	S, L	20 to 25	BLM/USFS
Grave	1062	Grave	Fair	Poor	L	1.0	Colo./BLM adjacent
Graveyard Gulch	1063	Cemetery	Unknown	Unknown	L	Unknown	Private and BLM
Rito Alto Cemetery	1064	Cemetery	Fair	Fair	L	10.0	Private/BLM adjacent
Crestone Cemetery	1065	Cemetery	Good	Good	L	40.0	Private/BLM adjacent
Private Cemetery	1066	Cemetery	Fair	Fair	L	10.0	Private/BLM adjacent
Villa Grove Cemetery	1067	Cemetery	Fair	Fair	L	15.0	BLM
Orient Mine	1068	Mine	Fair	Fair	L	20 to 25	Private/BLM adjacent
Orient Railline	1069	Railbed	Fair	Poor	S, L	25.0	BLM
Crestone Railline	1070	Railbed	Poor	Poor	L	1.5	BLM
Saguache Mill	1071	Mill site	Good	Fair	L	10.0	BLM
Hodding Gravesite	1072	Graves	Fair	Fair	L	1.0	BLM/County
Stage Station	1073	Stage Station	Fair	Poor	S, L	5.0	Private/BLM adjacent
Jacks Creek	1074	Cemetery	Fair	Fair	L	1.5	Private/BLM adjacent

a/ Integrity refers to the historical condition of a site--its present condition, past condition, and present setting. A site with "good" integrity would appear virtually as it was when it was built, while a site with "poor" integrity would be either totally obliterated or so substantially modified that it would no longer be recognizable.

b/ Condition refers to the present physical condition of a historical site--the condition of the structure(s) or area of the site, including any evidence of vandalism that is present, the condition of architecture, and the condition of the land around the site. A site in "good" condition would have a building with excellent structural condition, the land around it would be nearly like the original, and there would be no signs of vandalism. A site in "poor" condition would show signs of decay, the land might be modified, and there might be signs of human or animal intrusion.

c/ N = national, S = state, L = local

d/ N.R. = National Register

and had a sod roof. It is totally isolated and has no outbuildings. It was probably built as a line cabin, or it might have been a miner's cabin.

Spanish Cross. Site Number 1047 on Mogotes Allotment. This cross, located on NRL, is made of wood and overlooks the town of Mesitas, Colorado. It was erected in 1925 and is a symbol of Spanish/Catholic heritage in southern Colorado and New Mexico. This cross is highly representative of Spanish culture in Colorado and New Mexico.

Ute Pass Road. Site Number 1046 on Findley Gulch Allotment. This road was built in the late 1860s from Saguache into Ford Creek and later provided access to the gold mines of the Kerber Creek areas. It crosses Ute Pass and is in fair condition. It is currently in use as a jeep trail. This property is on NRL and national forest lands. It is of National Register quality.

Cabin at Cabin Draw. Site Number 1055 on Cross Creek Allotment. This site is located on NRL and in range country. The cabin is made from logs and has a sod roof. It shows evidence of having been in use until the late 1920s. It was probably built about 1910 as a miner's cabin (there are evidences of mining in the area).

Rock Creek Cemetery. Site Number 1053 on Rock Creek Allotment. This site is directly adjacent to NRL and is in open-range country. It is fenced, but the fence is down and the gates are not secure. A number of the headstones have been knocked over, probably by livestock since livestock manure in the cemetery indicates that animals have been in the area. The site is one of the oldest cemeteries in the region (1879) and is of local historical importance.

Rock Creek Cabins. Site Number 1052 on Rock Creek Allotment. This site is on private land adjacent to NRL. The private owner has indicated an interest in exchanging this land for NRL. There are five structures on the site, and they are in fair condition. The site represents early settlement and possibly was an old lumbering camp.

Jacks Creek Mine. Site Number 1054 on Cross Creek Allotment. This site is on seventeen acres of private land surrounded by NRL. On this site there is a wooden shaft house, a windlass, and a tipple. This mine was built about 1940 to extract silver. It is of local historical value since it represents very late attempts at precious mineral extraction.

Graves near Chiquita Peak. Site Number 1038 on McMahon Allotment. These graves are located on NRL just off the county road leading from Gomez, Colorado. They are badly marked, unidentifiable, and nearly impossible to see. They are of local historical significance and represent early settlement in the area.

Hodding Creek Graves. Site Number 1072 on Mill Hill Allotment. These graves are located along Hodding Creek and contain the remains of the Hodding family, early settlers in the area. The graves are marked with bronze plaques mounted on a nearby rock. The oldest grave (1885) is illegible. This site is located on private land, adjacent to NRL.

La Garita Wagon Ruts. Site Number 1057 on Carnero Creek Allotment. This site is located in the hills of Wilson Arroyo on NRL. The ruts are deeply cut into the hillside and have not been damaged by humans nor livestock. They represent a wagon road from La Garita, Colorado into the La Garita Mountains. They have not been dated.

Aesthetics

The San Luis Valley offers a wide variety of perceptual experiences. The north end of the valley, between Poncha Pass and Villa Grove, is a transition zone for the motorist traveling on U.S. 285. When driving north, the motorist finds that the valley narrows from a floor about six miles wide to a gentle, rolling pass less than one mile across. The Cochetopa Hills on the west form a rounded, indistinct boundary that contrasts sharply with the converging line of jagged peaks of the Sangre de Cristo Range.

The Sangre de Cristo Mountains rise abruptly from the wide, flat valley floor (with elevations of 8,000 to 9,000 feet) to an 11,000-foot ridgeline that displays many 13,000- and 14,000-foot peaks. The 70-mile procession of mountain peaks is impressive and comprises the only class A (high quality) scenery visible in the San Luis Valley from outside of the Rio Grande National Forest. NRL along the Sangre de Cristo Mountains are mainly limited to the large alluvial fans that form the transition between the mountains and the valley. The land is mostly dry and treeless. The large areas of oakbrush on the NRL provide fall color that adds to the beauty of the mountains. Figure II-31 shows a typical view of the valley floor.

Very few constructed features are visible. The dirt road over Hayden Pass creates a side-slope scar that is visible for many miles. Scars left at the Orient Mine are quite visible during winter and early spring. However, the tailings are the same color as the soil, allowing them to blend with the surrounding landscape at a distance of two miles.

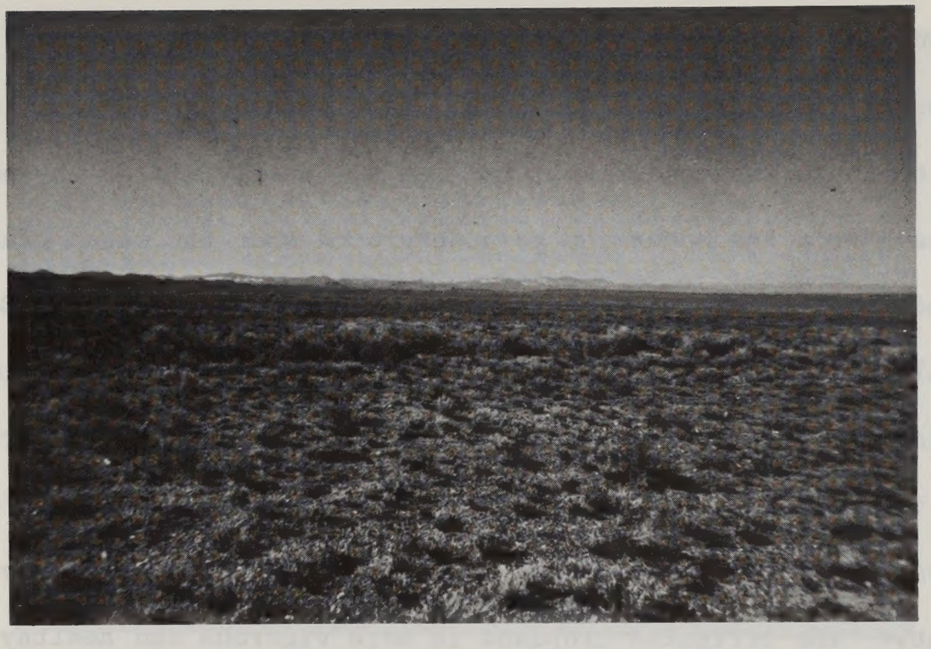

Figure II-31. View of the floor of the San Luis Valley

(The mine is six miles from U.S. 285.) Two large BLM pinyon-juniper chainings on the western slope of Mt. Blanca are very evident because of their unnatural shape and the vegetation that grows in the long furrows created by the chaining, giving them a striped appearance. Pinyon pine and juniper are gradually growing into the clearings and will eventually fill them.

The Great Sand Dunes are next to the Sangre de Cristo Mountains. The massive shifting dunes appear completely out of context. The unexpected contrast draws immediate attention from any point in the valley within 20 miles of the dunes. The best views available are close to the dunes since the dramatic visual effect is reduced with distance.

As shown in figure II-31 (p.II-186), the floor of the San Luis Valley is mostly flat, dry, and desolate. Rabbitbrush, greasewood, sage, and grasses dominate the nonagricultural lands. Nearly all of the perennial streams from the mountains go underground when the water reaches the dry, sandy valley. Those that remain flowing--the Rio Grande, Conejos River, Alamosa River, Rio San Antonio, and La Jara Creek--are slow and meandering and lined with cottonwood trees. The nonirrigated cropland in the valley is dry and drab, and the rural houses and nearby communities have an impoverished appearance. This is particularly true in Conejos County. The irrigated cropland is more vigorous and healthy looking. This entire area is considered class C (low quality) scenery.

A significant contrast is found in the Blanca (figure II-32). The area is located about fourteen miles southeast of the Great Sand Dunes and is within the geologic area that supplies the sand for the giant dunes. The desolate, rolling, semi-stable sand dunes and dry alkali lakes are suddenly broken by dikes, ditches, primitive roads, water, lush green vegetation, and an abundance of waterfowl. The abrupt change is startling and pleasing.

Most of the NRL on the valley floor is limited to scattered tracts between 80 and 1,000 acres. The largest block of land is about 10,000 acres and includes the Blanca.

The NRL in the eastern part of Conejos County are distinctly different from the land along the Sangre de Cristo Mountains or in the rest of the

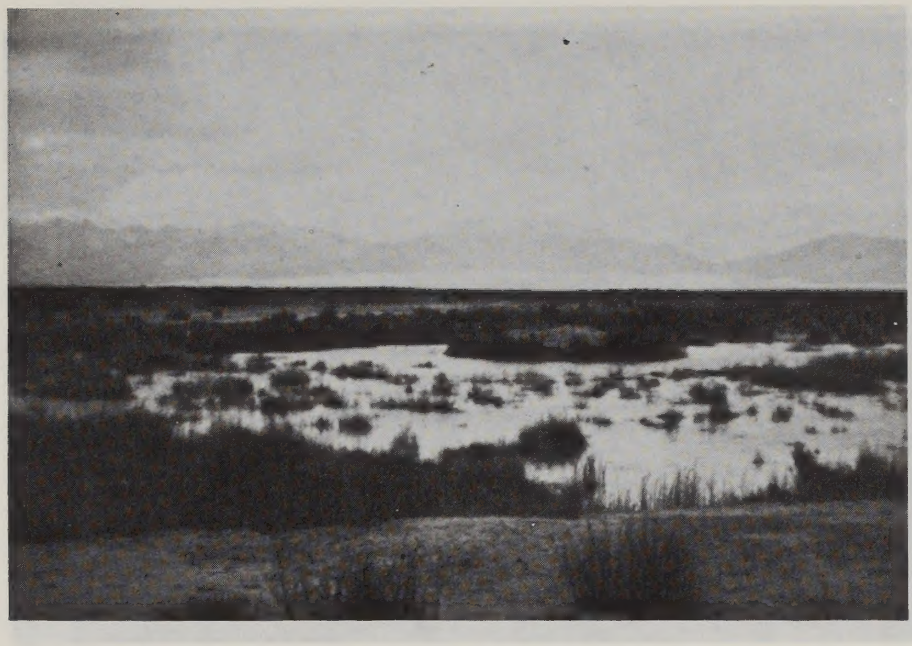

Figure II-32. View of pond with waterfowl nesting island in the Blanca WHMA

valley floor. As figures II-33 and II-34 illustrate, the land is dry, rocky, and empty. The Brownie Hills, Flat Top Mountain, Pinon Hills, and South Pinon Hills are arranged evenly along a north-south axis about 20 miles long and are considered class B (average scenery). The only trees in the area are pinyon-juniper on the Pinon and South Pinon Hills. With the exception of three county roads traversing the area and the King Turquoise Mine, little evidence of human use and influence exists. The general silence common to most of the NRL in the San Luis

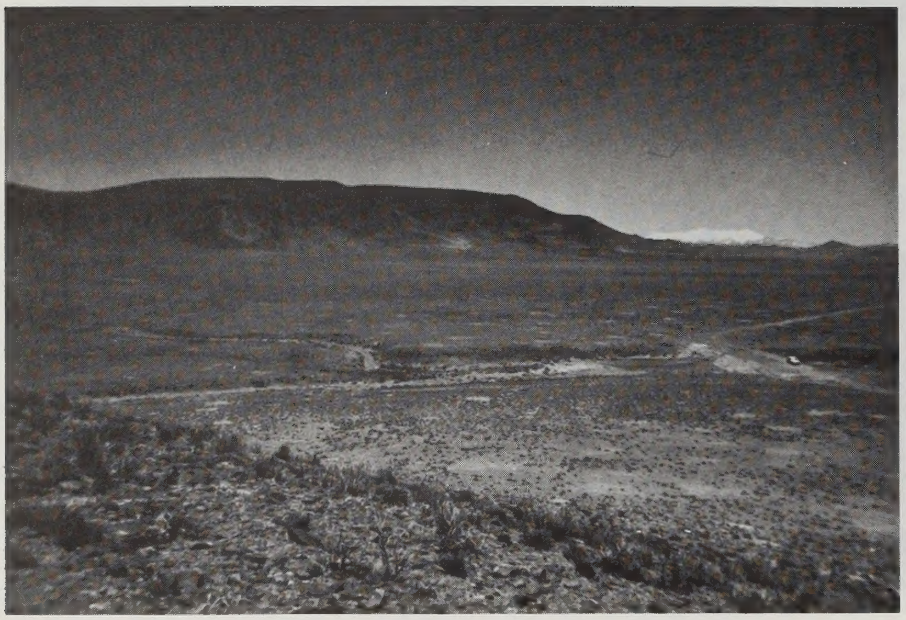

Figure II-33. View of Pinon Hills from the south of Kiowa Hill

Valley is emphasized in this area by the empty, "timeless" hills.

NRL in the western portion of the Conejos Planning Unit are treeless and have a rolling topography that is bounded on three sides by deep, almost vertical-walled canyons. Most of the land is dry and treeless and, like the majority of NRL in the resource area, the atmosphere is one of desolation and emptiness. The area has been rated as class C scenery.

Evidence of human impact is centered in the Poso area. A system of flood control structures (dikes, ditches, and reservoirs) was constructed

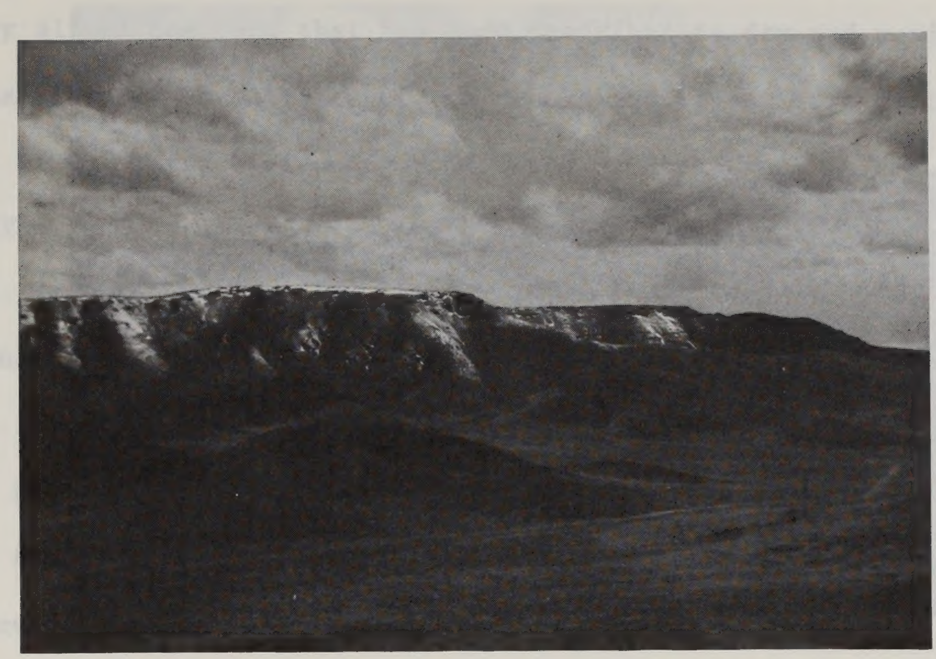

Figure II-34. View of Flat Top Mountain from the north

in the Poso basin. The entire basin has been affected and as a result has retained very little of its natural integrity.

The landscape changes to class B scenery between La Jara Canyon and Rock Creek and becomes more varied and dominated by steep-sloped, rocky foothills covered with a patchwork of open areas, pinyon-juniper stands, and some ponderosa pine. Rock outcrops are common and often associated with the steep-walled gulches and small canyons that are found throughout the area (figure II-35).

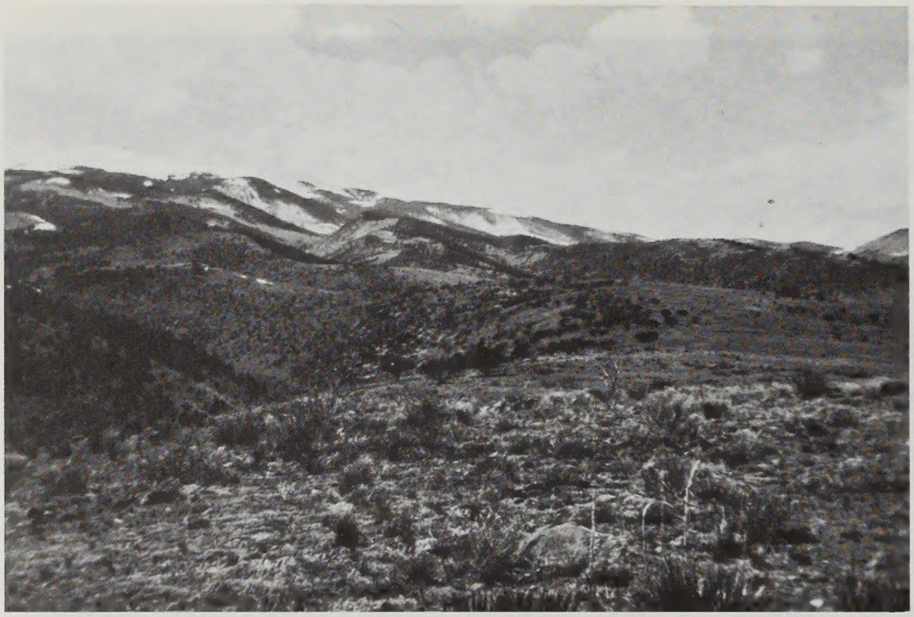

Figure II-35. View to the west of the north rim of Rock Creek Canyon

The major canyons between La Jara Creek and Rock Creek offer an interesting visual experience. When standing or motoring in La Jara Canyon, Ra Jadero Canyon, and portions of Hot Creek, Cat Creek, and Rock Creek, one experiences a strong feeling of being enclosed and separated from the rest of the world. The atmosphere of enclosure is enhanced by the general lack of human development and activity in these areas.

Greenie Mountain is a feature that is distinctive. Its rounded, timbered form rises 3,000 feet above the valley floor and is a dominant feature on the west side of the resource area. When viewed from the east, it is a focal point for the foothills south of Del Norte.

The creeks and rivers in the western Conejos Planning Unit and the Terrace Planning Unit are almost entirely in private ownership. Since virtually all of the land that has been described is dry and motionless, the visual impact and activity of the creeks and rivers form welcome change. The part of the Terrace Planning Unit north of Rock Creek is dry and very rocky. The land is a series of low hills with numerous small draws and gulches. The scattered pinyon-juniper community, numerous rock outcrops, and weatherbeaten boulders provide a varied and interesting landscape that has been rated as class B scenery. Long distance viewing is often not possible because of the topography.

The NRL between South Fork, Del Norte, and Saguache are relatively homogeneous. When viewed from the floor of the San Luis Valley, the NRL is a collection of bare, rounded hills that are very drab in comparison to the forested mountains that can be seen behind them (figure II-36). Some cliffs and more interesting hills can be seen near South Fork and in small areas between Saguache and Del Norte; however, these are isolated exceptions. This area was rated as borderline class B scenery. When viewed from within the hills, however, the area looks more interesting and varied. A sense of enclosure with many points of convergence is fostered by the hills. The hills are particularly appealing in the spring and early summer before the grass and brush turn brown.

The NRL to the west of Saguache and between Saguache and Villa Grove are mostly dry, rounded hills sparsely forested with pinyon-juniper and marbled by eroding draws sparsely covered with grasses and forbs. This land is more interesting to view than the bare hills due to wider variety

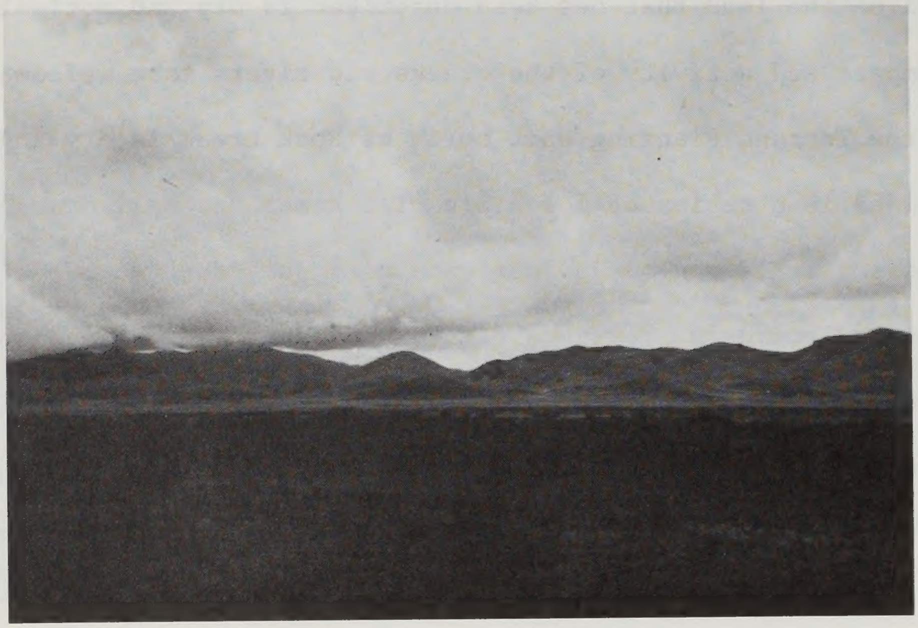

Figure II-36. View to the west of NRL between Del Norte and Saguache as seen from U.S. Highway 285

within the landscape and is rated class B scenery. The hills west of Saguache form a wide corridor for motorists on Colorado Highway 114 between Del Norte and Saguache.

The Trickle Mountain area stands out as a distinctly different landscape from the rest of the land in the western part of the Saguache Planning Unit. The combination of cliffs, coniferous forest stands, open parks, and high open ridges carpeted with pink (a yellow-flowered herbaceous plant), creates a very pleasant landscape. Although more interesting than any of the NRL between Del Norte and Villa Grove, this area did not quite merit class A scenery and is therefore rated as class B.

Evidence of human activity is scattered throughout the Saguache Unit. Abandoned cabins, earthen dams, seedings, chainings, and mining activity are common to the unit. The area most significantly impacted by human activity is between Villa Grove and Bonanza. Enclosure is the aesthetic principle which dominates the valley between the two towns. The valley is two miles wide near Villa Grove and only one-half mile wide near Bonanza. The convergence experienced as one moves toward Bonanza is also matched by increasingly frequent and greater visual effects of mining activity. The land near Villa Grove shows little evidence of mining activity. At the other extreme, the land near Bonanza (particularly Kerber Creek) has been heavily affected by human presence.

Not all of the evidence of past human use in the San Luis Valley is aesthetically adverse. Many of the old cabins and mines still in existence are picturesque and add to the charm of the areas in which they are found.

Visual Sensitivity

A visual sensitivity analysis has been prepared for NRL and all other land ownerships in the San Luis Resource Area outside of the Rio Grande National Forest and Costilla County. (Procedures are presented in BLM Manual 6300.) This visual sensitivity analysis (figure II-37) shows visible foreground (0 to 1 mile) and middle ground (1 to 5 miles) for both highly and moderately sensitive features. The analysis is a means of measuring relative degrees of visual care to be used when constructing

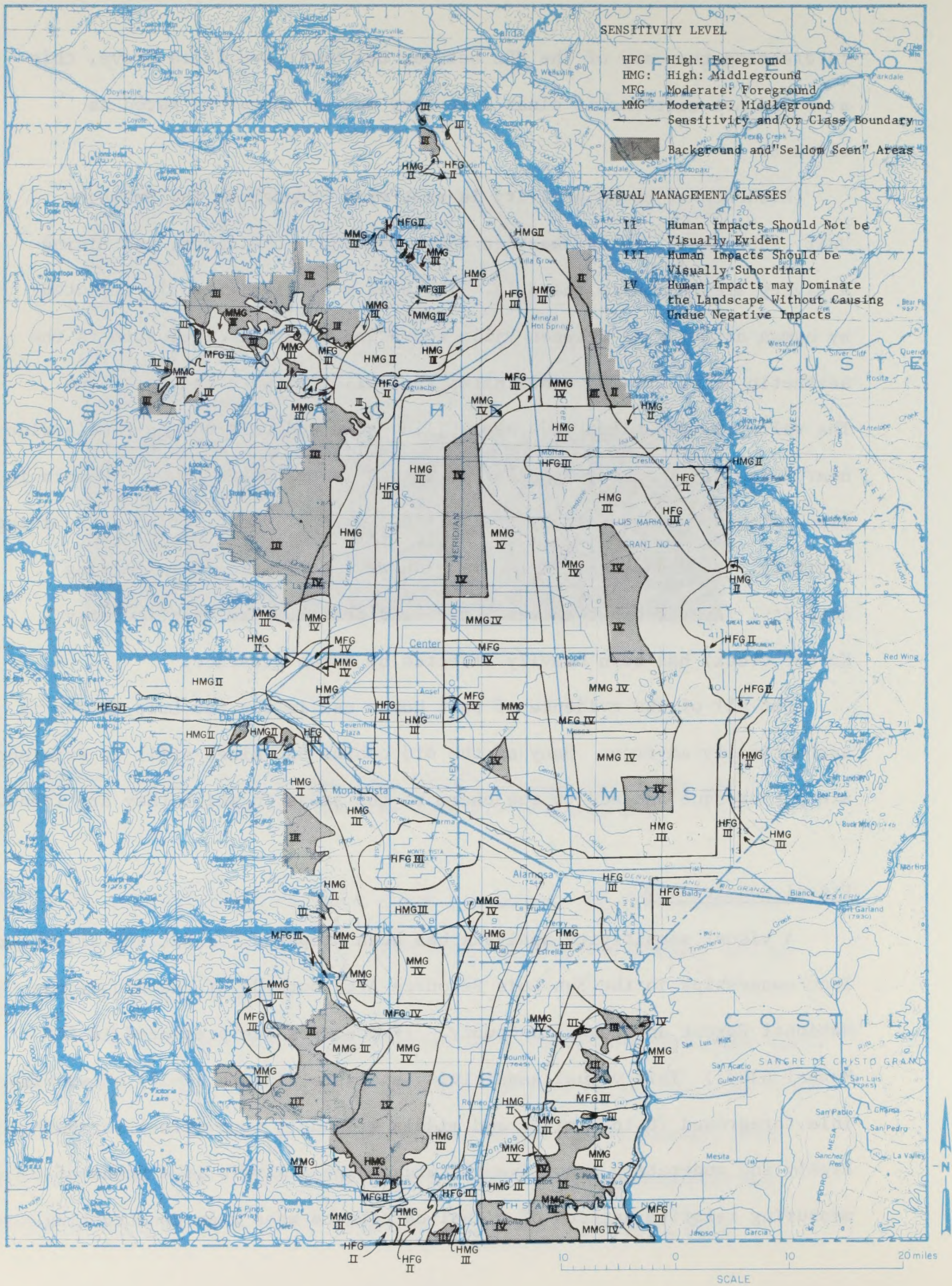
SENSITIVITY LEVEL
HFG High: Foreground
HMG: High: Middleground
MFG Moderate: Foreground
MMG Moderate: Middleground
Sensitivity and/or Class Boundary
Background and "Seldom Seen" Areas
VISUAL MANAGEMENT CLASSES
II Human Impacts Should Not be Visually Evident
III Human Impacts Should be Visually Subordinant
IV Human Impacts may Dominate the Landscape Without Causing Undue Negative Impacts
10 0 10 20 miles
SCALE
N

Figure II-37. Visual sensitivity analysis

projects, and it also indicates where a specific type of project would and would not produce unacceptable visual impacts. Examples of highly sensitive features include national parks, major highways and tourist routes, communities dependent upon tourism, and mountain subdivisions.

Highly sensitive features identified by this analysis are Bonanza, Saguache, Crestone, the Baca Grande, South Fork, Del Norte, Monte Vista, Alamosa, Great Sand Dunes National Monument, Monte Vista National Wildlife Refuge, Alamosa National Wildlife Refuge, the access road to Crestone, Pikes Stockade (visually enclosed), Antonito, U.S. Highway 285, U.S. Highway 160, the Rio Grande south of the Mesitas Bridge, Cumbres and Toltec Railroad, and the southern approach to the Great Sand Dunes National Monument.

Examples of moderately sensitive features are state and federal highways not classified as highly sensitive and developed but not intensely used as recreational sites and travel routes. Moderately sensitive features identified are La Jara Reservoir; Sanford; Manassa; Colorado state highways 15, 17, 112, 114, 142, 150, 360, 370, 371, and 374; the access road to Bonanza; the western approach to the Great San Dunes National Monument; and the Alamosa River road into the Rio Grande National Forest.

Combining the scenic quality of the area with the visual sensitivity allows delineation of visual zones (see figure II-37, p.II-195). In the resource area only zones II, III, and IV are involved. These zones indicate relative amounts of disturbance and visual contrast (with the surrounding landscape) that are and are not acceptable. Retention of foreground and middle ground delineation is necessary to maintain consideration of scale. Visual zone II implies man-made features should not be visually evident. Visual zone III implies man-made features should be visually subordinate elements in the surrounding landscape. Visual zone IV implies man-made features may dominate the landscape without causing undue negative visual impacts.

Socio-Economic Conditions (Regional)

The San Luis Valley is both a natural geographic and socio-economic region consisting of six counties--Alamosa, Conejos, Costilla, Mineral, Rio Grande, and Saguache.

Population

Although the valley region includes 8,180 square miles, or 7.9 percent of Colorado, its 1975 estimated population is 38,300, or 1.5 percent of the state total, for a density of about five persons per square mile. The valley population decreased slightly from 1960 to 1970 (-3.2 percent, with a 1970 population of 37,466), although the communities of Antonito, Alamosa, Creede, and Monte Vista gained in population. Since 1970, the population decline has leveled off, with the Colorado Division of Planning projecting a 1980 population of 41,000. This estimate represents a projected 1970 to 1980 increase of 7 percent.

The ethnic composition of the population shows a strong Hispanic-American heritage with 46.1 percent of the 1970 population being of Spanish-American descent.

Income

Economically, the San Luis Valley is a relatively poor, predominately agricultural region. While some indications of a beginning diversification of the valley's economy are apparent, the 1973 valley personal disposable income totaled $99.1 million, or 1.0 percent of the state's total. The average-per-household disposable income was $8,800--a figure substantially below the state average of $12,900.

With respect to distribution, 22 percent of the households had incomes below $3,000, with 14 percent above $15,000 compared to 11 and 24 percent respectively for the state. This low-income situation is reflected in 1970 census data, which indicate that 19 percent of all year-round housing units lacked some or all plumbing facilities. Thus, the low-income situation leads to a need to replace existing low quality housing, as well as provide for projected population increases.

Range Livestock Related Income

In 1969, the total annual range livestock feed requirement was 1,643,266 AUMs with a livestock related agricultural income of $2,568,000, yielding an average income of $1.56 per AUM of feed required. Considering the range livestock income multiplier of 1.535, the total direct and indirect income generated per AUM was $2.39. At that time (1969), BLM-licensed livestock consumed an estimated 36,000 AUMs of range forage, yielding a direct income of $56,160 and a gross valley income of $86,205. Thus, NRL contributed an estimated 2.19 percent of livestock industry income and 0.09 percent of regional income. (Estimated total regional income was $59,995,000.) Considering the multiplier effects of livestock industry income on other industry sectors increases the NRL contribution to only 0.14 percent of regional income.*

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* This analysis includes Costilla and Mineral counties. Since there is no BLM-licensed livestock grazing in these counties, the deletion of these two counties might increase the apparent livestock industry dependency on NRL. However, since the number of livestock in these counties is relatively low and the relative populations and incomes are also low, their elimination from the analysis would have no significant effect on the conclusions drawn.

Thus, from a regional income point of view, the San Luis Valley economy is only minutely dependent on livestock forage provided by NRL.

Contract Construction Related Income

Since implementation of grazing management plans would require some improvements that would affect the regional construction industry, it should be noted that the contract construction industry in 1970 generated a regional primary income of $3,034,000. This figure represents 5.06 percent of all regional income. With an estimated income multiplier of 1.053, the direct and indirect effects total an estimated $3,194,802, or 5.33 percent of total valley income.

Recreation-Related Income

Income resulting from recreation-related activities is generally included in other industry or sector categories, primarily wholesale and retail trade and services. The San Luis Valley provides opportunities for a wide array of recreational pursuits, including rodeos, cultural activities, hunting, fishing, and other outdoor recreation-related activities.

The economic impacts of all recreation activities are not currently known. However, a recent study by Colorado State University indicates that sportsmen's expenditures in 1973 totaled $16,094,526 for the San Luis Valley. Estimates indicate that 20 to 25 percent of these expenditures resulted in income to valley residents.

Employment

Total employment in the region was 13,810 in 1973 with 677 people, or 4 percent of the resident labor force, unemployed. A substantial number of workers--14 percent of those living in the region--commuted to jobs outside the region.

Labor force participation rates for both men and women in the region are low; 70 percent for adult men and 30 percent for adult women compared to 81 percent and 45 percent respectively for the state's metropolitan areas. This is partially accounted for by the higher than average proportion of men over age 65 (15.1 percent compared with 12.1 percent statewide). This age distribution results from the emigration of younger people in search of opportunities elsewhere. Thus, the potential work force in the valley is much larger than what currently exists and could be realized if emigration, unemployment, and underemployment were diminished through generation of more and better employment opportunities.

Currently, government is the largest generator of income and the largest employer in the San Luis Valley. The presence of Adams State College and other federal, state, and local facilities and offices accounts for the higher-than-average proportion (23.4 percent versus 18.0 percent statewide) of government employment.

Agriculture has, until recently, been the largest employer in the region. The agricultural sector still employs 21.3 percent of the labor force. Mining, while not a major employer, is important in some of the higher reaches of the valley.

Manufacturing, while employing only 5.9 percent of the region's work force, is the most dynamic sector of its economy. The recent location of a ski parka manufacturing plant in Alamosa is primarily responsible for this stimulation. Other manufacturing employment is based on the region's agricultural and mineral resources.

The region's scenic and recreational attractions also generate employment and income, but these effects are included primarily in the services and trades sectors. Figure II-38 shows the percentages of employment, by sector, in the San Luis Valley.

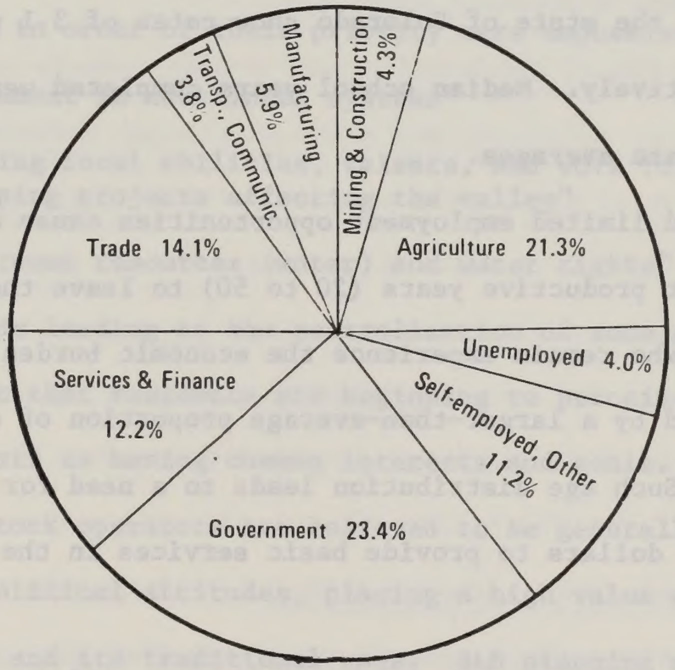

Figure II-38. Chart of 1973 Civilian Work Force in the San Luis Valley (Colorado Division of Commerce and Development 1975)

Social Well-being

As the income information suggests, the relative well-being of people in the San Luis Valley can easily be termed poor. Several of the counties in the San Luis Valley rank among the highest in the state with respect to the proportion of the population on welfare. For fiscal year 1973-74, Costilla County ranked first with 44.3 percent on welfare; Conejos ranked second with 35 percent on welfare; Saguache, third with 22.4 percent; Rio Grande, fifth with 13 percent; and Mineral, thirty-fourth with 7.3 percent.

Another indicator of well-being, the rate of functional illiteracy, shows that, in 1970, 9.2 percent of the total population and 20 percent of the Spanish-surnamed population were considered functionally illiterate. Comparable data for the state of Colorado show rates of 3.1 percent and 13.3 percent respectively. Median school years completed were also below comparable state averages.

The poverty and limited employment opportunities cause many younger people in their most productive years (20 to 50) to leave the region. As a result, those who remain experience the economic burden of a population characterized by a larger-than-average proportion of children and older people. Such age distribution leads to a need for a net inflow of state tax dollars to provide basic services in the region (e.g., education).

Thus, the high proportion of the population on welfare, the lower-than-average rates of functional illiteracy, a net emigration of people in their most productive years, and other indicators all support the conclusion that the social well-being of the population in the San Luis Valley is low.

Socio-Cultural Attitudes

The people of the San Luis Valley can be characterized as generally "rural-western." While attitudinal and cultural differences are apparent, it is believed that most people would like to see an improvment in socio-economic conditions. The Spanish-American population appears to the the most cohesive group and shows a desire to retain its cultural identity.

At a 1974 meeting of elected officials and community leaders representing a variety of interests, affiliations, and geographic areas, the following topics in order of their priority were emphasized.

1. "Improvement in eductional systems"
2. "Utilizing local abilities, talents, and work force in developing projects affecting the valley"
3. "Underground resources (water) and water rights"

Recent trends leading to the centralization of some governmental functions suggest that residents are beginning to perceive the valley and its inhabitants as having common interests and goals.

Range livestock operators are believed to be generally conservative in their socio-political attitudes, placing a high value on an attachment to the land and its traditional uses. BLM planning meetings in the valley reveal the following attitudes: protection of natural resource values; prohibition of recreational vehicle use on erodable soils; support for protective stipulations on energy development; some willingness to eliminate or reduce grazing to protect certain wildlife species; protection of natural areas without public designation as primitive areas; and support for management methods, instead of chemical or mechanical treatment, as the way to control undesirable plant species. Thus, in spite of a concern about social and economic well-being, prevailing attitudes seem to support management alternatives that are most in harmony with recognized biological processes.

Other comments and contacts suggest that livestock operators would like to expand their operations if the range resource would allow it. However, the need for improvement of range conditions generally seem to be understood, with allottees offering excellent cooperation during the development of new management proposals.

With the exception of the noted recent trends, people in the area value making their own political decisions in a local governmental framework. An influx of new people in connection with a successful sales effort involving one or more of the several land (subdivision) developments would undoubtedly introduce differing cultural and attitudinal variables. No influx is expected, however, given existing national and local economic conditions.

Other Social Support Facilities and Services

The adequacy of existing health, police, fire, sewer and water, and other systems is not expected to be affected by the proposed action. Thus, these items are not discussed in this statement.

Future Environment Without the Proposal

The description of the future of the environment with the proposed action is based on conditions that are expected to exist in the year 2005 and is mainly derived from historical data and past trends. Without the proposed action, the livestock grazing program in the San Luis Resource Area would continue much as it has in past years and would be dependent on existing levels of funding. If recent trends of stable-to-moderate increases in range program appropriations are combined with a continuing relatively high level of inflation, the net real funding available for implementation and supervision of intensive grazing management would continue to decline.

Current funding levels suggest that one to two AMPs would be implemented per year. Therefore, by the year 2005 about 30 to 60 AMPs would be implemented. Areas with known resource problems--e.g., deteriorated wildlife habitat and actively eroding watersheds--would be the first to be scheduled for AMP development. (See table VIII-1, p.VIII-3 for schedule of implementation.)

Climate

Figure II-39 shows a time series developed from the precipitation record available from Saguache for the period 1895-1975. This annual time series was subjected to a moving average scheme (nine years) in order to detect long-term trends in the data. Both short- and long-term fluctuations (wet and dry periods) are evident in figure II-39. The nine-year moving average reveals a long-term cycle having a frequency on the order of 40 years. The durations of these cycles are ten years and

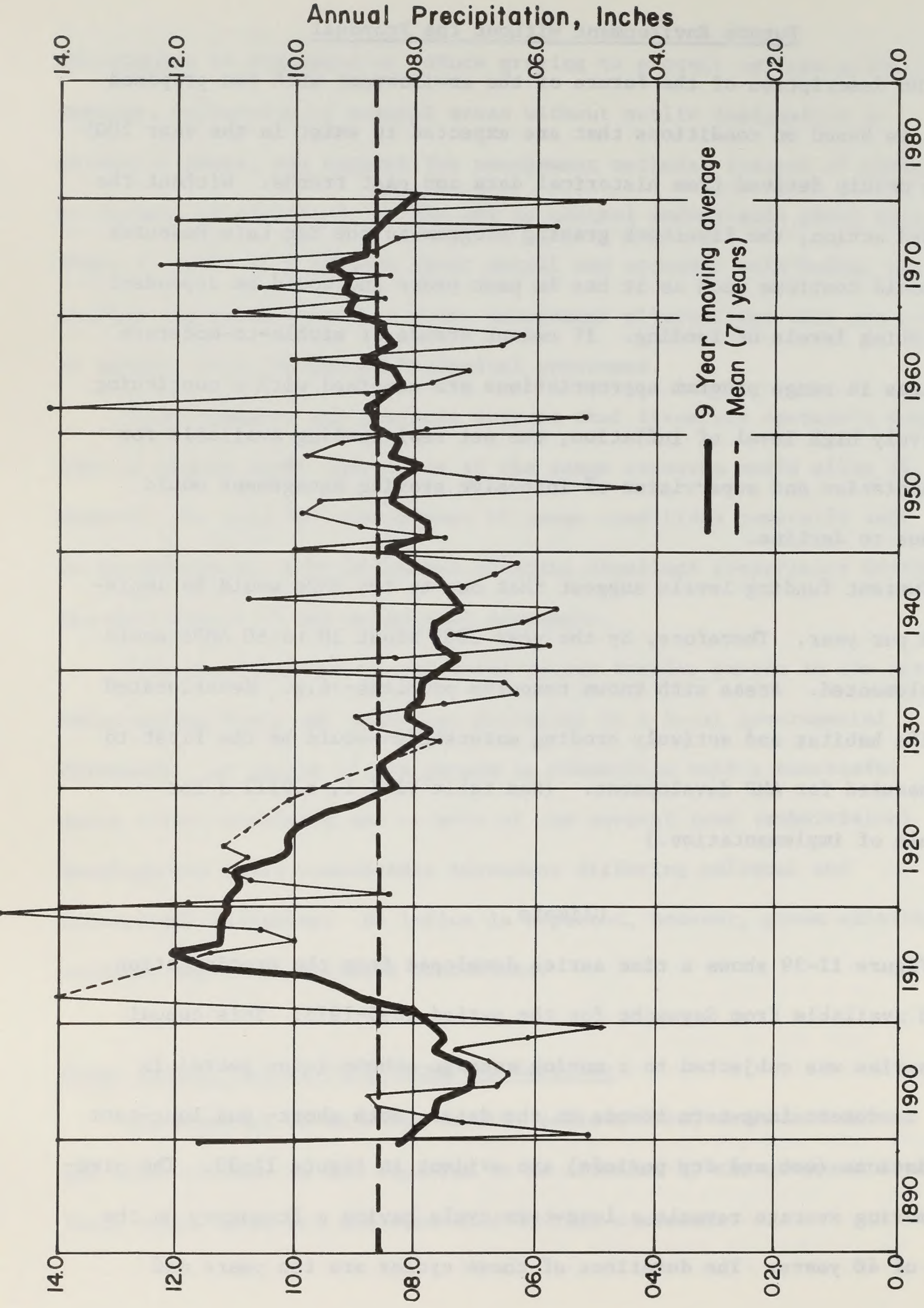

Figure II-39. Annual and moving average of precipitation for Saguache (1895-1975)

longer. Based on these data, a period of low annual precipitation is expected to continue and intensify over the next ten to fifteen years. This drought would be followed by a period of above average annual precipitation, peaking in about 30 to 40 years.

Air Quality

Dust particulate matter is the only agent that influences air quality which would be affected by the proposed action. As stated earlier in this chapter, dust particulate matter makes a minimal contribution to particulate pollution in the valley. Therefore, no change in the air quality of the valley is expected 30 years in the future.

Soils

Erosion condition classes are expected to remain unchanged on areas grazed during the spring and the summer with or without grazing management. The following changes in the erosion condition classes would be expected on areas which would be grazed in the fall and the winter: a 17,355-acre increase in the stable condition class; a 564-acre increase in the slight condition class; and decreases of 16,670 and 1,249 acres in the moderate and critical condition classes respectively.

Soil losses are expected to remain unchanged on management units where range improvements are not planned for construction prior to 2005.

Soil losses would be an estimated 45,878 tons as a result of the construction of range improvement projects up to 2005.

Water

It is anticipated that in 2005 watershed conditions in the San Luis Valley will not change significantly from present conditions.

Both soil water and runoff usually increase as precipitation increases and decrease as precipitation decreases. In addition, stream flow and groundwater recharge and discharge vary with precipitation and are also affected by storage capacities, which are determined by soil types, infiltration, slope, and so forth.

Throughout the resource area, sediment yields would be expected to decrease an estimated 5,205 tons per year by 2005. A 50-year storm event during 2005 would result in an increase in sediment yield of 85 to 2,203 tons.

Water quality of the large river systems would remain unchanged.

Vegetation

Since NRL in the San Luis Valley are mainly used for grazing, the influence of activities other than grazing would be difficult to determine for the year 2005. The major impact would result from a change in land use, that is, a shift from grazing to some other land use.

Several attempts have been made to subdivide private grazing lands in the San Luis Valley. This change in use would result in a greater demand for grazing on public lands. Mineral and geothermal developments have a potential impact on shifting land-use patterns by reducing the area available for grazing purposes. Geothermal development may produce an excess of warm water that would, in turn, affect the vegetative types. Increased demand for timber products would make logging on the marginal

NRL timber lands more economical. Such logging activities would result in more intensive management and possible species conversions. Thinning of timber stands would open the canopy for a period of years, allowing an increase in grass, forb, and shrub composition.

Range condition trends are expected to remain unchanged on the areas not included in grazing systems. Changes on the areas within grazing systems would be as follows: ground cover would increase from 15-20 percent to 30-40 percent, vegetal production would increase by 10-30 percent and composition of cool season species would increase.

Threatened or Endangered Vegetation Species

Further studies in the San Luis Valley may disclose more threatened and endangered species. Adams State College (Alamosa, Colorado) is continuing to add to and revise its valley plant list. Increased interest in this area would increase the possibility of discovering additional plant species and varieties.

Wildlife

Population trends of the terrestrial wildlife of the San Luis Resource Area are not expected to be significantly different in 2005 without the proposed action. Table II-42 shows the projected populations of herbivorous big-game animals in the San Luis Resource Area in 2005.

It is expected that AMPs would eventually be implemented in the future to alleviate the problems of significant livestock-wildlife competition on areas where competition now occurs. This would ultimately result in similar wildlife populations with or without the proposed action. These AMPs would result in improved range condition and increased big-game forage; but losses of habitat due to human pressure would offset any population gains on NRL and, at best, would result in similar populations.

Pressures resulting from expansion of the human population and its economic and recreational pursuits are creating the greatest impacts on wildlife populations. The trends in wildlife populations in the future would depend to a large extent on how well these pressures are controlled or managed.

Mule deer, elk, and antelope are generally tolerant of humans, but their populations would continue on a declining trend in the future because of loss of habitat, especially as a result of subdivision of

TABLE II-42. PROJECTED BIG-GAME POPULATIONS
IN THE SAN LUIS RESOURCE AREA FOR 2005

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL Change	Projected Population, NRL Population after Change
Mule Deer	4,500	+20%	None	4,500
Elk	2,600	+20%	None	2,600
Antelope	1,145	+25%	None	1,145
Bighorn Sheep	250	+30%	+20%	300

* The maximum estimated population to use NRL at least part of each year

** Forage provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

private land and human harassment. The most crucial forms of harassment are those during periods of stress, for example, snowmobiling on winter ranges or the disturbing of fawning or kidding ranges by off-road vehicles, hikers, and campers. Populations of other tolerant animals such as most small game and nongame animals would also decline an unknown amount for the same reasons.

Other animals less tolerant of human disturbance face even greater odds against maintenance of productive populations. These include mountain lions, black bears, golden eagles, prairie falcons, and hypothetical populations of the endangered peregrine falcon and black-footed ferret. Large predatory animals, such as mountain lions, black bears, raptors, golden eagles, and prairie falcons, would probably continue to inhabit the area, but they would also continually seek more remote areas and their numbers would decrease. Endangered species, such as the black-footed ferret (if present), would also continue to decline and could eventually disappear in spite of efforts to preserve them.

Aquatic and Riparian Communities

Without accelerating implementation of improved grazing systems, the aquatic and riparian communities would continue to decline slowly in those management units not included in AMPs until the communities eventually reach some stable level below the present conditions. According to past rates of degradation, a 15 to 20 percent reduction over present conditions might be expected during the next 30 years. This would result in a loss of 8 miles of permanent streams and 14 miles of riparian habitat.

Land Use

Controls and Constraints

Although the San Luis Valley contains a large number of rural subdivisions in varying degrees of development, Colorado State Senate Bill (SB) 35, tight money, inflation, and high interest rates have acted as a brake on lot sales and subdivision development. Existing subdivisions would probably meet present and near future demands which SB 35, in establishing more stringent standards for subdivision development, is expected to curtail by greatly restricting the establishment of new subdivisions in favor of better planning and engineering.

Congressional enactment of some form of "organic act" is expected to place NRL under more effective control. This legislation is expected to grant BLM enforcement authority necessary for more efficient management of the public lands and its resources. If necessary, Congress may place other controls and restrictions on management and use of NRL.

Saguache and Conejos counties are presently drafting formal zoning regulations, although adoption of such regulations is not expected to significantly affect the future use of rural lands.

Recreation

Significant use increases in available outdoor recreation areas (developed and undeveloped) would be expected. However, the average income of San Luis Valley residents is predicted to remain below Colorado State average. This below-average income would probably result in the selection of informal, less-costly activities. The data on table II-43 support this hypothesis by indicating the projected deficit of activity days for future recreational use of public lands. The majority of use increase in the San Luis Valley can be expected to occur on the Rio Grande National Forest and NRL.

Agriculture (non-grazing)

The future outlook of non-grazing agriculture is expected to remain unchanged. Water for irrigation is presently oversubscribed, and suitable privately owned land available for agricultural development exceeds water supplies. Seasonal fluctuation of land under cultivation is directly proportional to that season's runoff. There are no known irrigation projects in the planning stage which would store water to be used more effectively.

NRL for the most part is not suitable for development to non-grazing agriculture. This land is expected to remain in federal ownership since it is more valuable for forage production. The future environment without the proposal would remain as it presently exists.

Livestock Grazing

Range conditions will probably continue to decline over the short run in some areas where deterioration is presently taking place. Where AMPs would be implemented, the long-term trend would be toward improved forage conditions. In other areas where the present condition is stable or improving, no real changes are expected. Thus by 2005, domestic

TABLE II-43. SUPPLY DEFICIENCIES OF ACTIVITY DAYS RELATED TO PUBLIC LANDS (by 2005 A.D.)

Additional Need in Activity Days	Activity
375,030	General Activities
361,312	Any type of hunting
267,369	Motorcycling on roads
178,150	Camping in a campground
100,657	Camping in a special camp for groups
76,808	Four-wheeling on regular roads
10,241	Horseback riding on roads
10,241	Skiing cross-country on trails
10,241	Showshoeing on trails

SOURCE: San Luis Valley Council of Governments, Open Space and Outdoor Recreation Plan. Data were modified to apply to the year 2005 A.D.

livestock use of NRL is expected to be somewhat above current actual use levels and licensed use would be similar to existing licensed use levels.

Ongoing trends in the San Luis Valley indicate that the number of beef cattle and calves increased by 37.7 percent between 1970 and 1974. During the same time period the number of stock sheep and lambs decreased by 42.8 percent. Recent indicators suggest a leveling off in the number of beef cattle and calves and a reduction in the rate of decrease of stock sheep and lambs.

For the future it is expected that beef cattle numbers would remain near present levels and that the number of stock sheep and lambs would continue to decrease. Many operators in the valley are substituting cattle for sheep in their operations as a result of the difficulties associated with hiring capable herders and coping with other economic problems.

While U.S. Department of Agriculture studies project national increases in the demand for AUMs of grazing of from 40 to 99 percent by the year 2000, range resources in the San Luis Valley could probably not support increases much in excess of current inventory levels. Major livestock increases would come only at the expense of other agricultural activities, such as conversion of cropland back to rangeland or pasture. Improved management practices on all lands (private as well as public) would facilitate some increases. Improved economic conditions would also provide incentives to increase livestock numbers.

In summary, the number of beef cattle and calves is expected to remain at or slightly above current levels. Some cyclical reductions and expansions are expected in response to changing market and climatic conditions. The number of sheep and lambs would probably continue to decrease, but at rates below those in the recent past. Gradual exhaustion of fossil fuel reserves may increase the cost of artificial fibers, increasing wool prices and possibly reversing the downward trend in sheep numbers by the turn of the century. The net effect would be a moderate increase in the demand for AUMs as population growth and food needs continue to expand.

Mineral Resources

Future geothermal development is anticipated, especially in the vicinity of Villa Grove and Mineral Hot Springs, as described in the

Umbrella Environmental Analysis Record (EAR) for geothermal leasing in San Luis and Upper Arkansas valleys, No. 05-050-5-66. No major conflicts would be expected between geothermal development and a continuation of present livestock grazing policies.

Transportation Networks

The transportation network which presently exists in the San Luis Valley is adequate to serve the needs of the public. In the absence of any positive evidence pointing to a significant change in the valley's economy, no large-scale transportation expansion is predicted. Some upgrading of present facilities may be accomplished as dictated by need and availability of funds. New facilities would result only if the population would increase significantly and/or if new industries would develop which required improved transportation.

Archaeological Resources

In the year 2005, vandalism and weathering processes would continue to be the two major factors contributing to the loss of archaeological values. It is doubtful that additional monies (purchase power) or staffing would be available to combat these factors on any notable level.

The existence of an "organic act" for the BLM would provide more protective enforcement authority; however, its benefit to archaeological resources would probably be offset by a dramatic increase in mining pressure due to the high value of industrial metals.

Aesthetics

Although present interest in geothermal steam appears to be diminishing, technologic advances may encourage development of this power source near Villa Grove and Mineral Hot Springs. This development would significantly reduce the scenic quality of the area. Increased population resulting in increased subdivision development would also contribute to the reduced scenic quality of the San Luis Valley. Greater mining pressure for extraction of metals could also be expected to have significantly reduced the scenic quality of the area by 2005 A.D.

Socio-Economic Conditions

Population

The declining population trend of the past decade (1960-1970) is expected to reverse and, by the year 2005, the total population is projected to range between about 52,000 and 64,000.* This estimate represents an increase of 37 to 70 percent over the 1970 census year. Unless unforeseen economic stimulation occurs, the expected population level would be closer to the lower estimate.

Income

Without further diversification of the area's economy, income levels would probably remain below the state average. Foreseeable economic activity would not erase current income deficits.

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* This estimate is based on data presented in "Colorado State and Regional Population Projections, 1970 to 2000; Summary Report," prepared for Colorado Division of Planning by David E. Monarchi, Business Research Division, University of Colorado, 1975.

Major developments in the area of geothermal energy could stimulate substantial change as could continuing growth of the manufacturing sector. Total regional income would likely increase or outmigration would increase and projected population levels would not be realized. If recent trends are maintained, income levels would move closer to state averages. Total regional income for the year 2005 is not estimated since such factors as inflation, population levels, and future economic activity are all subject to substantial variation.

Employment

Diversification of the economy is expected to increase the relative significance of the manufacturing sector, generating additional employment. Given the assumptions discussed earlier in the section on population, employment is projected to increase from 13,714 in 1970 to between 20,611 and 29,075 persons in 2005. These estimates represent increases in employment ranging from 50 to 112 percent for the 35-year period and suggest that total employment would increase more rapidly than total population.

Both projections indicate that unemployment rates would increase. From a region-wide unemployment rate of 4.5 percent in 1970, the "pessimistic" and "optimistic" projections for unemployment in 2005 are 5.4 and 4.9 percent, respectively. Thus, although total employment is projected to increase faster than total population, it would not increase fast enough to accommodate the relative increase in the working age population. If assumed outmigration levels are maintained, the projections suggest that residents of the San Luis Valley must deal with an economic future about as difficult as its economic past. Obviously, a thriving economy in other parts of the nation would stimulate outmigration and reduce the local problem.

Social Well-being

In view of the relatively poor well-being of people in the San Luis Valley and the limited expectations regarding new economic development, only limited improvement is expected in the foreseeable future. The "well-being deficit" is too large to be erased by expected developments.

Socio-Cultural Attitudes

No major influx of new people from other areas of the country is expected, and social and economic conditions appear to be changing only slightly. Some changes would occur as educational systems, television viewing, and other communication means bring predominantly urban values and attitudes of the nation to present and future residents. However, other national trends suggest that a strengthening of "older" traditional values is also occurring. Thus, although some change is expected, socio-cultural values and attitudes are likely to be less affected by grazing management considerations than by other socio-cultural variables. If world and national population growth continues and valley residents face projected economic difficulties, it appears that natural resources would be more highly valued for both consumptive and nonconsumptive uses.

CHAPTER III. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This chapter identifies and analyzes impacts of the proposed action. Each impact is analyzed in a cause and effect manner, and secondary impacts are identified and traced as far as practical.

The cause identified is tied to a component of the project proposal (Chapter I) and the effect identified is tied to a component of the environment (Chapter II). Components in Chapter II which are not significantly impacted are not discussed in this chapter.

Soils

Implementation of 62 AMPs with spring or summer grazing (see Table III-1) would result in little or no change in erosion rates except with the occurrence of a high-intensity storm--a 50 year storm event (Gifford et al. 1975). With such a storm, 50 of the 62 AMPs (302,431 acres NRL) would have increased erosion rates because infiltration would have decreased with the concentration of livestock grazing during the spring or summer (Gifford et al. 1975). Even increases in ground cover (as projected in AMP objectives) and short periods of rest from grazing through implementation of grazing systems would not counteract this impact; full recovery of infiltration was projected by Gifford et al. (1975) to require four years of complete rest.

Erosion rates on the remaining 12 AMPs (26,651 acres NRL), despite spring or summer grazing, would remain essentially the same as they are now, even with the occurrence of a 50 year storm event. These allotments contain soils that are not susceptible to compaction by livestock because of their texture, which ranges from moderately coarse to very cobbly and stony.

Grazing during the fall and winter when the ground is frozen or semi-frozen has little or no effect on soil infiltration rates. With the expected increases in ground cover and no decreases in the infiltration rates, overland flow and sediment yields would decrease, resulting in a reduction in erosion rates on the winter use AMPs (144,834 acres). Table III-2 shows AMPs grazed during the fall and winter.

TABLE III-1. SPRING-SUMMER GRAZED AMPs

Allotment Number and Name	Acres	Allotment Number and Name	Acres
1P Poncha Pass West	1,925	65P Upper Coolbroth	1,780*
2E Arizona-Colorado	12,173	66P Lower Coolbroth	605*
4P West Clover Creek	160	70P Rio Grande Canal	4,360
7P Alder	1,349*	73P Alder Creek	275*
9E Turquoise Gulch	3,806	76P Sanderson	510
10E Kelly Creek	6,999	79P Branch	2,457
11P Kerber Creek	4,500	82P Nicomodes	3,080
14E Noland Gulch	7,650	83P Raton Creek	3,940
15P Nye	1,460	84P Rock Creek	12,680
16P East & West San Luis Creek	2,740	85P McMahon	15,016
22P Piney Creek	2,510	86P Greenie Mountain	8,114
23P Steel Canyon	4,472	93P Posito Creek	4,991
24P Mirage	2,395	97P Romero Canyon	1,730
25E Valley View Hot Springs	4,927	98P Ra Jadero Canyon	6,730
28P Cotton Creek	3,880	100E Ciscom Flats	3,680
31P Hutchinson	835*	102P La Jara Creek	820
34P Mineral Hot Springs	10,260	106P Little Mogotes	13,510
39P Findley Gulch	11,345	107P Grande	3,950
41P Laughlin Gulch	6,643	108P Mogote Flat	1,978
42P Poison Gulch	14,357	109P Poso	5,240
45P Cross Creek	6,305	110P Los Mogotes	7,514
46P Trickle Mountain	19,562	111P Big Horn Creek	760
50P Rabbit Canyon	3,835	116E Twin Lakes	8,153
51E Saguache Park	1,920	120P Pinon	7,210
55P Mill Hill	4,167	121E Kiowa Hills	4,302
56P Higgins Spring	753	129P Rio Grande	2,975*
58P West Tracy Ridge	925*	132P Four Mile	320*
60P Tracy Cattlemen's	27,749	134P Foothills	4,700*
61P Tracy Individual	1,676*	137P Blanca	5,220*
63P Biedell Creek	2,462	141P Zapata Falls	5,991*
64P East of Carnero Creek	11,849	159E Klondyke	1,169
		TOTAL	329,082

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*Little or no change from the present hydrologic conditions is expected with implementation of spring or summer grazing management on these allotments as a result of increases in plant covers and/or the stony, cobble strew soil associations.

TABLE III-2. FALL-WINTER GRAZED AMPs

Allotment Number and Name	Acres	Allotment Number and Name	Acres
36P McIntyre Gulch	4,602	95P Poso Creek	2,240
47P Sheep Creek	2,031	96P Capulin	5,589
48P Taylor Canyon	2,902	99P Cinder Pits	15,370
52P Hat Springs	4,554	112P Railroad	3,741
53P Robb Ranch	1,488	113P Llano	5,261
57P Mitchell	938	115P Alta Lake	11,446
59P Tracy Ridge	893	117P River	2,324
67P Carnero Creek	2,318	119P South Valley	1,800
68P La Garita	1,082	122P Braiden	960
69P Elephant Rocks	3,517	123P Eight Mile	5,640
77P Bowen	488	124P Pinon Hills	9,274
78P Schrader Creek	640	125P Rio Grande Common	18,611
80P Pup Peak	5,002	126P La Sauses	3,200
81P Limekiln	5,050	133P Tobin Creek	6,126
87P Gato-Hutchinson	1,960	138P Dry Lakes	5,836
88P Triangle	3,715		
89P Alamosa River	760		
94P Jadero Flats	5,200	TOTAL	144,834

The erosion rates for the management units eliminated from grazing (5,930 acres) would also decrease. Erosion rates for the custodial and unallotted management units (36,525 acres) would remain unchanged since no change in the use of these units has been proposed.

Change in erosion rates occurring in the resource area as a result of implementing this proposed action would produce changes in soil productivity but they would be difficult to measure.

As a result of increased ground cover throughout the resource area, movement of soil by wind would be reduced, but present information is inadequate to predict how much.

Increases in soil loss from the construction of range improvements needed for implementation of intensive grazing management are shown by management units in Table III-3. These increases would result from surface disturbances before the land could be stabilized.

The loss of 12,330 tons of soil resulting from the construction of range improvements was estimated by considering the acreage temporarily disturbed and the time required for reaching a stable condition through revegetation (table III-3). With the total removal of ground cover for installation of range improvements, soil loss rates from these areas were estimated to be 8 tons per acre, which is comparable to the high sediment yield class (Colorado Land Use Commission 1974).

Since revegetation is greatly dependent upon the climate, especially annual precipitation, the time required has been estimated as follows: ten years at 7 to 10 inches of precipitation, eight years at 10 to 12

TABLE III-3. SOIL LOSSES

Allotment Number	and Name a/	Soil Losses from Range Improvement Disturbance: Yrs. Required for Stabilization	Soil Losses from Range Improvement Disturbance: Soil Loss (Tons)
1F	Poncha Pass West	3	17
2E	Arizona Colorado	*	
4P	West Clover Creek	*	
7P	Alder	*	
9E	Turquoise	*	
10E	Kelly Creek	*	
11P	Kerber Creek	3	179
14E	Noland Gulch	*	
15P	Nye	8	30
16P	East & West San Luis Creek	8	140
22P	Piney Creek	5	43
23P	Steel Canyon	5	32
24P	Mirage	8	106
25E	Valley View Hot Springs	*	
28P	Cotton Creek	5	122
31P	Hutchinson	5	28
34P	Mineral Hot Springs	10	160
36P	McIntyre Gulch	5	31
39P	Findley Gulch	5	163
41P	Laughlin Gulch	3	27
42P	Poison Gulch	5	7
45P	Cross Creek	3	90
46P	Trickle Mountain	5	20
47P	Sheep Creek	3	19
48P	Taylor Canyon	3	9
50P	Rabbit Canyon	5	38
51P	Saguache Park	*	
52P	Hat Springs	3	25
53P	Robb Ranch	*	*
55P	Mill Hill	5	80
56P	Higgins Spring	5	26
57P	Mitchell	*	
58P	West Tracy Ridge	*	
59P	Tracy Ridge	*	
60P	Tracy Cattlemen's	5	229
61P	Tracy Individual	*	
63P	Biedell Creek	3	42
64P	East of Carnero Creek	3	168
65P	Upper Coolbroth	*	
66P	Lower Coolbroth	*	
67P	Carnero Creek	*	
68P	La Garita	*	
69P	Elephant Rocks	*	
70P	Rio Grande Canal	8	298
73P	Alder Creek	5	11
76P	Sanderson	5	199
77P	Bowen	*	
78P	Schrader Creek	8	
79P	Branch	8	188
80P	Pup Peak	8	864
81P	Limekiln	8	1,185
82P	Nicomodes	8	173
83P	Raton Creek	5	40
84P	Rock Creek	5	764
85P	McMahon	5	76
86P	Greenie Mountain	5	1,310
87P	Gato-Hutchinson	3	512
88P	Triangle	3	171
89P	Alamosa River	5	77
93P	Posito Creek	5	89
94P	Jadero Flat	5	51
95P	Poso Creek	8	95
96P	Capulin	8	61
97P	Romero Canyon	3	22
98P	Ra Jadero Canyon	3	54
99P	Cinder Pits	*	500
100E	Ciscom Flat	*	
102P	La Jara Creek	*	
106P	Little Mogote	5	592
107P	Grande	5	85
108P	Mogote Flat	5	523
109P	Poso	8	179
110P	Los Mogotes	5	195
111P	Big Horn Creek	3	17
112P	Railroad	3	102
113P	Llano	5	128
115P	Alta Lake	8	421
116E	Twin Lakes	*	
117P	River	8	89
119P	South Valley	10	54
120P	Pinon	8	136
121E	Kiowa Hills	*	
122P	Braiden	*	
123P	Eight-Mile	3	117
124P	Pinon Hills	3	54
125P	Rio Grande Common (Flat Top)	10	783
126P	La Sauses	10	122
129P	Rio Grande	10	25
132P	Four Mile	8	3
133P	Tobin Creek	8	20
134P	Foothills	8	26
137P	Blanca Allotment (WHA)	8	37
138P	Dry Lakes	8	24
141P	Zapata Falls	8	19
159E	Klondyke	*	
		TOTAL	12,330

a/ P = Proposed AMP, E = Existing AMP

* No range improvement projects are proposed

inches, five years at 12 to 16 inches, and three years at more than 16 inches.

There would be a long-term loss of 318 tons of soil annually attributable to the 150 miles of primitive roads evolving from the construction and subsequent maintenance of the range improvements.

There would be a short-term loss in the productivity of the soil because of the temporary surface disturbance during construction of range improvements. The loss in productivity would last for three to ten years as shown in table III-3.

Four management units--Garner Creek, Mondragon Individual, Saddleback, and Park Pasture--would require 3.5 miles of fencing in order to eliminate livestock grazing. Three acres would be temporarily disturbed and would take five to eight years after disturbance for stabilization. During this period, 79 tons of soil would be lost.

The loss of soil productivity would be minimal since only three acres would be affected, and stabilization would take five to eight years.

On the 62 AMPs which have spring-summer grazing, the erosion condition classes would change very little. For these allotments, 17,883 acres would remain in the stable class; 175,484 in the slight class; 134,358 in the moderate class; and 1,357 in the critical class.

On the AMPs grazed in the fall and the winter, there would be changes in the erosion condition classes as a result of increases in ground cover, litter, and root systems. The expected changes in erosion condition classes are as follow:

Condition Class	Present Condition (acres)	Expected Condition (acres)	Difference (acres)
Stable	6,244	55,282	+ 49,038
Slight	62,252	49,466	- 12,786
Moderate	63,035	36,760	- 26,275
Critical	13,303	3,326	- 9,977
	144,834	144,834	

The following changes in the erosion condition classes are expected to occur with the elimination of grazing:

Condition Class	Present Condition (acres)	Expected Condition (acres)	Difference (acres)
Stable	160	2,717	+ 2,557
Slight	4,590	2,557	- 2,033
Moderate	650	524	- 126
Critical	530	132	- 393
	5,930	5,930	

The erosion condition classes are expected to remain unchanged on the custodial and unallotted management units--19,544 acres as slight, 7,000 acres as moderate, and 9,981 acres as critical.

Summary

An aggregate of the condition classes would be as follows:

	Present Condition (acres)	Expected Condition (acres)	Difference (acres)
Stable	24,287	75,882	+ 51,595
Slight	261,870	247,051	- 14,819
Moderate	205,043	178,642	- 26,401
Critical	25,171	14,796	- 10,375
	516,371	516,371	

A "one time" soil loss of 12,330 tons would be expected from construction activities. An annual loss of 318 tons would be expected because of the primitive roads.

Water

Moderate and heavy levels of continuous summer grazing have detrimental effects on the rangeland hydrologic cycle (Gifford et al. 1975). Water infiltration rates decrease and runoff from intense storms increase in proportion to grazing intensity. The causes generally given for such effects are the removal of foliage and the trampling by livestock, which in turn affect several of the numerous variables associated with water infiltration and detention storage of overland flow.

A simulation model (Gifford et al. 1975) was used to predict hydrologic changes resulting from the implementation of AMPs on NRL in the San Luis Valley. For present conditions, moderate grazing was assumed to be occurring on each management unit regardless of terrain or water locations. The model altered infiltration rates according to the particular grazing system proposed, and storm runoff was then determined.* Measurable impacts to the water resources from grazing management were not evident with storm events smaller than 50-year storms. However, storm events larger than 50-year storms do have measurable impacts, which are described in this section.

Basically, reductions in infiltration rates would occur on areas where grazing systems would be implemented and summer grazing would be involved. The reductions would be caused by the concentration of livestock, which would occur during each grazing phase. The reductions

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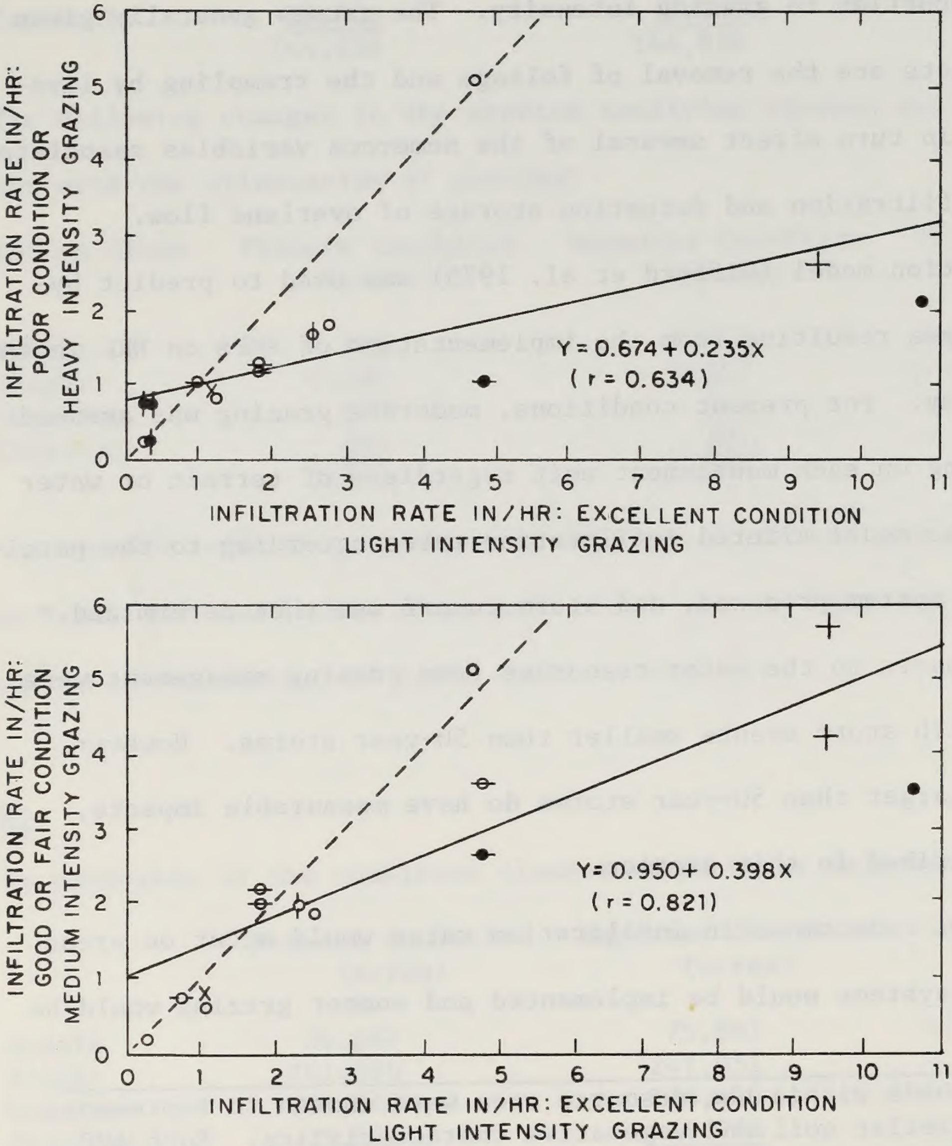
*Eight watersheds within the resource area were chosen to represent areas with similar soil and vegetative characteristics. Each AMP that fell within a representative watershed was broken down by pasture and analyzed for changes in infiltration rates accounted for by the equations presented in the figure and the proposed grazing system. "Heavy grazing," under a rotation scheme, was simply defined as all livestock being confined to a single pasture for any given length of time, and "moderate" grazing was defined as the livestock being spread over more than one pasture. All infiltration rates were fully impacted



under either heavy or moderate use regardless of length of the grazing period (e.g., heavy grazing for two months = heavy grazing for six months). "Recovery" between grazing periods was calculated assuming a linear four (4) year recovery time to some hypothetical pregrazing status. The equation representing this is $f_r = f + (f_o - f)t/T$ (in/hr), would vary considerably on an areal basis within any pasture. The greatest impact on infiltration rates would occur in areas that had been grazed lightly or moderately in spring or summer and that have soil associations susceptible to surface compaction (table II-13, p. II-37) and are accessible to livestock. Pasture areas not accessible to livestock (e.g., steep slopes), heavily grazed areas (e.g., drainage bottoms), and areas having very coarse and rocky soils would not experience significant reductions in infiltration rates. Also, infiltration rate reductions are not anticipated on winter-grazed allotments.

Recovery of infiltration rates to the maximum potential rate for any given site during a no-grazing period was assumed to occur linearly over four years. Actually, recovery rates would vary somewhat within a pasture, depending upon climate, soil types, slope aspect, and soil water conditions.

Surface Water Quantity

The current total water yield from NRL in the San Luis Valley amounts to about 35,000 acre feet, or about 1.4 percent of the total annual water supply to the San Luis Valley. Basinwide impacts of the proposed action can probably best be summarized according to whether

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where f_r is the rate at the end of the recovery period, f_o is the pregrazing optimum rate defined by the hydrologic soil group, f is the beginning rate, t is the rest time in years, and T is the recovery time in years (in this case four years).

Winter grazing was assumed to have no effect on hydrologic properties (Ponce et al. 1975) and vegetative cover objectives outlined in the AMPs were assumed to be essentially predictions of cover after full implementation.

proposed allotments would be grazed sometime during the spring and summer or whether they would be grazed during the fall and winter.

Spring-Summer Grazing Periods. Runoff from normal or average annual summer storms would not be increased significantly.

Of the 62 AMPs which have spring-summer grazing periods (see table III-1, p. III-3), 50 AMPs (302,431 NRL) would be expected to have decreased infiltration rates. Increased surface runoff and peak flows would result in response to severe thunderstorms (50-year storm events).

Twelve AMPs (26,651 acres NRL) with spring-summer grazing periods would be expected to have stabilized and/or improved hydrologic conditions even with the 50-year storm event. These improved conditions would be due to the nature of the soil associations--soils which are well drained, medium and moderately coarse textured, and on alluvial fans are very cobbly and story and are not conducive to compaction--and increases in ground cover, which in turn would reduce overland flow.

Fall-Winter Grazing Periods. Runoff from intense low probability summer storms would in general be decreased on 33 AMPs (144,834 acres NRL) which have fall or winter grazing periods only (see table III-2, p. III-4), the exact amount being a function of storm type and projected increases in ground cover. Peak flows would be reduced in a similar way.

Water Yield would decrease in proportion to any decrease in runoff from intense, low-probability summer storms.

Decreases in recharge within stream channels would be expected to be proportional to these runoff decreases.

In summary, surface water quantity (runoff) would increase from spring-summer grazed pastures but not from fall-winter grazed pastures during high intensity storms. Normal precipitation would not cause increased runoff regardless of season of grazing.

Surface Water Quality

Under spring-summer grazing periods, severe thunderstorms (50-year storm events) would result in unknown alterations in chemical water quality of surface water during and immediately following the storm event. Sediment transport capacities (see table III-4, p. III-17 for changes in sediment yield by allotment) would be greater because of the reduced infiltration rates and increases in sheet and gully erosion. Pedestalling would result from the increased overland flow of water. Streampower energy available for channel erosion would increase in an exponentially proportional manner (3.5 power of velocity increases) to peak storm-flow velocities. Streams passing through pastures heavily grazed would be subject to decreases in biological water quality.

Changes in sediment yield on management units receiving intensive grazing management are shown in table III-4 (p. III-17).

Increases in sediment yield could occur during the occurrence of a 50-year storm event on those AMPs (see table III-1, p. III-3) in which spring-summer grazing is proposed. Estimates are that the sediment yield would increase by 3 to 5 percent on each of those management units. The sediment yield during the year of the 50-year storm would be 178,126 to 181,584 tons, or an increase of 5,183 to 8,647 tons. Approximately 302,431 acres of NRL would be affected. With the proposed grazing management systems, sediment yield would not be expected to change either annually or in the event of a 50-year storm on 12 management units (26,651 acres; see table III-I, p. III-3).

Based on observations of local conditions, increases in erosion or sediment yield would, in most instances, occur in the drainage ways rather than on the uplands.

Sediment which has already moved into the channels would be prevented from entering major streams and rivers by the proposed construction of 46 earthen reservoirs and 46 check dams that would detain and delay storm flow. Sediment production generated from normal storm sizes would not be greatly different with or without AMP implementation.

On pastures grazed during fall and winter, the impact on chemical quality of summer runoff waters would be negligible. Concentration of livestock would cause decreases in biological water quality, the exact amount being a function of livestock distribution with respect to stream channels and of storm type.

Total sediment transport capacity would decrease, the decrease being proportional to any decreases in flow and stream velocity (3.5 power function of velocity). Table III-3 (p. III-6) shows changes in sediment yield by AMP.

Decreases in annual sediment yield would be expected to occur on 33 AMPs proposed to have fall-winter grazing. The decreases in sediment yield on these management units would be 10 percent, or 9,950 tons per year. This reduced sediment yield would occur on 144,834 acres of NRL. The effects of the 50-year storm would be reduced on these management units in proportion to reduced runoff.

Elimination of grazing on 5,930 acres of NRL would gradually reduce the present sediment yield, which is 2,560 tons per year, by an unknown amount. This reduction would result from (1) infiltration rates approaching those rates intrinsic to the soil types which have never been grazed by livestock, (2) overland flow velocities being reduced by increased plant cover, and (3) channel stabilization. The present sediment yield from the 21 unallotted units, which cover 14,200 acres, is 6,843 tons per year. The rate of erosion of these acres has been generally constant and should not change.

Erosion or sediment yield from areas that remain under custodial management has been similar to that of the unallotted areas. Sediment yield from the 38 units, which cover 16,625 acres of NRL, is presently 9,010 tons per year and is predicted to remain unchanged under custodial management.

In summary, surface water quality would decrease because of increased sediment loads as a result of severe summer storms on those pastures grazed intensively during spring and summer. Pastures grazed during fall and winter would not cause decreased water quality following high intensity storms. Fall and winter grazing would not cause reduced water quality during normal precipitation. Biological water quality would decrease in streams where livestock are concentrated.

Ground Water Quantity

On site ground water recharge would increase by some fraction of the decreases in runoff from intense, low-probability summer storms.

The proposed 46 earthen reservoirs and 46 check dams would act to detain and delay storm flow, thus increasing ground water recharge (approximately 44 acre-feet annually) and evaporation losses (less than 75 acre feet annually).

An estimated 400 acre-feet of water would be removed from the ground water system annually by the proposed 22 wells and 27 spring developments. Some portion (quantity cannot be estimated) of this water would be returned to the ground water system through overflow systems.

Summary

Some general conclusions may be drawn with respect to seasons of grazing. The soil water deficit would not be affected appreciably in either case because most replenishment occurs during fall, winter, and spring in response to snowmelt or low-intensity rainfall.

Implementation of the proposed range improvements would result in negligible effects to the water resources of the valley. Some insignificant losses to the present hydrologic system would occur in the form of evaporation from impounded surface water and withdrawals of ground water.

TABLE III-4. SEDIMENT YIELD a/

Allotment Number and Name b/	Sediment Yield c/ (Tons)	Allotment Number and Name	Sediment Yield (Tons)	Allotment Number and Name	Sediment Yield (Tons)
1P Poncha Pass West	+35 to +58	61P Tracy Individual	-138	108P Mogote Flat	+36 to +49
2E Arizona Colorado	+188 to +417	63P Biedell Creek	+40 to +67	109P Poso	+94 to +157
4P West Clover Creek	+3 to +5	64P East of Carnero Creek	+189 to +315	110P Los Mogotes	+95 to +158
7P Alder	NC	65P Upper Coolbroth	NC	111P Big Horn Creek	+14 to +23
9E Turquoise	+69 to +114	66P Lower Coolbroth	NC	112P Railroad	-225
10E Kelly Creek	+138 to +166	67P Carnero Creek	-137	113P Llano	-316
11P Kerber Creek	+73 to +121	68P La Garita	-69	115P Alta Lake	-687
14E Noland Gulch	+138 to +230	69P Elephant Rocks	-211	116E Twin Lakes	+147 to +244
15P Nye	+37 to +62	70P Rio Grande Canal	+78 to +131	117P River	-139
16P East & West San Luis Creek	+64 to +107	73P Alder Creek	NC	119P South Valley	-1,039
22P Piney Creek	+36 to +60	76P Sanderson	--	120P Pinon	+130 to +216
23P Steel Canyon	+64 to +107	77P Bowen	-29	121E Kiowa Hills	+77 to +129
24P Mirage	+43 to +72	78P Schrader Creek	--	122P Braiden	-58
25E Valley View Hot Springs	+82 to +136	79P Branch	+44 to +74	123P Eight-Mile	-338
28P Cotton Creek	+69 to +116	80P Pup Peak	-300	124P Pinon Hills	-557
31P Hutchinson	NC	81P Limekiln	-303	125P Rio Grande Common (Flat Top)	-1,117
34P Mineral Hot Springs	+182 to +302	82P Nicomodes	+55 to +92		
36P McIntyre Gulch	-255	83P Raton Creek	+71 to +118	126P La Sauses	-192
39P Findley Gulch	+199 to +318	84P Rock Creek	+239 to +399	129P Rio Grande	NC
41P Laughlin Gulch	+110 to +184	85P McMahon	+260 to +434	132P Four Mile	NC
42P Poison Gulch	+251 to +418	86P Greenie Mountain	+142 to +237	133P Tobin Creek	NC
45P Cross Creek	+108 to +180	87P Gato-Hutchinson	-123	134P Foothills	NC
46P Trickle Mountain	+489 to +893	88P Triangle	NC	137P Blanca Allotment (WHA)	NC
47P Sheen Creek	NC	89P Alamosa River	-46	138P Dry Lakes	-175
48P Taylor Canyon	-170	93P Posito Creek	+72 to +120	141P Zapata Falls	NC
50P Rabbit Canyon	+54 to +91	94P Jadero Flat	-312	159E Klondyke	+21 to +35
51P Saguache Park	+26 to +43	95P Poso Creek	-134		
52P Hat Springs	-251	96P Capulin	-335		
53P Robb Ranch	-85	97P Romero Canyon	+17 to +26		
55P Mill Hill	+35 to +123	98P Ra Jadero Canyon	+106 to +176		
56P Higgins Spring	+13 to +22	99P Cinder Pits	-922		
57P Mitchell	NC	100E Ciscom Flat	+66 to +110		
58P West Tracy Ridge	+17 to +28	102P La Jara Creek	+7 to +12		
59P Tracy Ridge	-54	106P Little Mogotes	+237 to +395		
60P Tracy Cattlemen's	+597 to +994	107P Grande	+39 to +65		

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a/ Sediment yield includes soils from overland flow as well as sediment from channels.

b/ P = proposed AMP, E = existing AMP

c/ + = increase in sediment yield, - = decrease in sediment yield, NC = no change

NOTE: All increases shown would occur only during the year of a 50-year storm event. Annual increases on these AMPs would be too small to measure. The "decreases" and "no changes," however, would be annual occurrences.

Vegetation

Grazing anytime during the green periods of plants reduces the amount of food made and stored by plants, in turn reducing the plants' capacity to produce both shoot and root growth the following growing season (Hormay 1970). The green period in the San Luis Valley begins in mid-April and continues through September. Defoliation is most harmful when food reserves are lowest, which occurs anytime from when the plant is most rapidly growing to the time food storage is completed (Hormay 1970).

The ability of plants to withstand grazing defoliation varies from plant to plant and depends upon the season of defoliation and the degree of utilization. Cook (1971), in studies conducted in western Utah, found that continuous defoliation in excess of 75 percent was too severe for the species studied (sagebrush, saltbrush, squirreltail, and Indian ricegrass), regardless of the season when defoliation occurred.

Using fall levels of carbohydrates (food reserves) as an index to determine the severity of defoliation, Cook (1971) found these reserves at their lowest following defoliation during rapid growth periods, about May 1, or at maturity, about July 1. Defoliation at 50 to 60 percent of a current year's growth was less harmful in the fall, early or late winter, and early spring than when it occurred in late spring or early summer (Cook 1971).

Grazing management of the NRL in the San Luis Valley includes systems which prescribe livestock grazing during all seasons of the year. With the exception of the Alder Allotment (1344 acres) and those units receiving custodial management (16,625 acres), each management unit

(498,397 acres) would have timely, periodic rest from livestock grazing (defoliation) during the critical growing periods. The amount of rest needed would be determined by the key species that needed the most rest to regain vigor after it had been completely defoliated during the critical periods (Hormay 1970).

Changes in vegetation--ground cover, species composition, production, and condition--are determined in trend analysis and range studies currently being conducted on the 10 existing grazing allotments under intensive management in the San Luis Resource Area. These determinations form the basis for calculating the vegetative changes predicted as a result of the proposed action.

Table III-5 (pp. III-22 f.) shows the short- and long-term impacts on terrestrial vegetation that would occur with the implementation of the various grazing systems and the construction of the associated range improvements. (Impacts on aquatic and riparian vegetation are covered in table III-8, p. III-77).

Short-term impacts would be the result of the individual grazing treatments of the grazing systems and would last only one to two years. These impacts would relate to changes in plant vigor, reproduction, litter accumulation, and seedling establishment.

Long-term impacts would be those resulting from the implementation of the grazing system and, on some allotments, from the reduction in numbers of livestock. These impacts would occur within 20 years after a grazing system had been implemented.

Based on Soil Conservation Service range site description and vegetative production data, the basic soil resource on national resource lands in the San Luis Resource Area is theoretically capable of producing 375 million pounds of vegetation per year. Of the estimated 63 million pounds of present vegetal production, livestock grazing currently consumes 26 million pounds (35,000 AUMs) annually. No increases in this use level have been proposed. However, as a result of the proposed action, by 2005 as much as 34 million pounds (19,000 AUMs) of additional forage could be available, totalling 97 million pounds (54,000 AUMs).

These changes in vegetation would result in the following changes in range condition:

	Present Condition			Projected Condition (2005)		
Management	Good (Acre)	Fair (Acre)	Poor (Acre)	Good (Acre)	Fair (Acre)	Poor (Acre)
Rest Rotation	38,747	153,433	81,820	153,281	79,268	41,451
Deferred Rest Rotation	0	29,137	89,382	41,186	48,993	28,340
Deferred Rotation	11,198	31,202	16,701	26,799	19,776	12,526
Deferred	8,669	8,128	4,150	15,171	3,701	2,075
Season Long	749	600	0	749	600	0
Elimination	1,080	1,930	2,920	2,010	2,100	1,820
Custodial	1,000	15,625	0	1,000	15,625	0
Unallotted	10,000	9,900	0	10,000	9,900	0
Total	71,443	249,955	194,973	250,196	179,963	86,212

Overall changes expected in range condition would be as follows: There would be an increase of 178,753 acres classified as good, a decrease of 69,992 acres classified as fair, and a decrease of 108,761 acres classified as poor.

Thus, the intensified management program envisioned for the San Luis Resource Area is expected to produce the following cumulative effects over the long term (by 2005): a 350 percent increase in good condition range, a corresponding decrease in range of fair and poor condition, a 5 to 19 percent increase in vegetative cover, a 20 to 50 percent increase in cool season species (western wheatgrass, needle-and-thread, Arizona fescue, and Indian ricegrass) in the total vegetative composition, and increased litter accumulation. No measurable impacts on timber species are anticipated. See table III-5 (p. III-21 f.).

Construction of range improvements would temporarily remove 485 acres from production and permanently remove 104 acres. Recovery rates for the 485 acres of NRL temporarily removed would be closely related to precipitation. In areas receiving 16 or more inches of precipitation, the recovery rate would occur within approximately three years. In areas receiving less than 10 inches, however, ten years would be the length of the recovery rate.

During construction and subsequent maintenance of the range improvements, approximately 150 miles of primitive two-track roads would permanently remove an additional 37 acres from vegetal production throughout the resource area.

TABLE III-5. IMPACTS ON VEGETATION

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
1P Poncha Pass West 1925 Ac. NRL	1/3	Utilize 60%-80% of forage in early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	2.5	1.1
	1/3	Utilize 30%-50% of forage in late summer.	ST	Vigor, reproduction, and seed trampling increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock numbers by 32%.	LT	Ground cover increased from 20% to 35%, composition of cool-season species increased, range condition improved, and vegetal production increased from 675,000 lbs. to 900,000 lbs., a net increase of 225,000 lbs.		
2E Arizona-Colorado Poncha Pass East 2160 Ac. NRL	1/2	Utilize 40%-60% of forage in early summer.	ST	Reproduction and litter accumulation reduced.	--	--
	1/2	Utilize 40%-50% of forage in late summer.	ST	Vigor, litter accumulation, and reproduction increased.		
	Total Unit	Implement grazing management.	LT	Ground cover in seeded areas increased to 25%, composition of cool-season species increased, and vegetal production increased from 684,000 lbs. to 961,200 lbs., a net increase of 277,200 lbs.		
East Side 10,013 Ac. NRL	1/4	Utilize 50%-60% of forage in spring and early summer.	ST	Vigor and reproduction reduced.	--	--
	1/4	Utilize 60%-70% of forage in summer and fall.	ST	Reproduction and litter accumulation reduced.		
	1/4	Utilize 30%-50% of forage in late summer and fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse species increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, seedling establishment, reproduction, and litter accumulation increased.		
	Total Unit	Implement grazing management.	LT	Ground cover in seeded areas increased to 25%, composition of cool-season species increased, and total vegetal production increased from 3,375,000 lbs. to 4,438,800 lbs., a net increase of 1,063,800 lbs.		
3C Round Hill 160 Ac. NRL				No change		
4P West Clover Creek 160 Ac. NRL	Total Unit	Rest until mid-summer	ST	Vigor, reproduction, seed trampling, and seeding establishment increased.	--	--
		Reduce livestock numbers by 40%.	LT	Ground cover increased from 20% to 30%, cool-season species increased, range condition improved, and vegetal production increased from 81,000 lbs., to 90,000 lbs., a net increase of 9,000 lbs.		

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* Grazing capacity of management unit divided by the number of pastures equals the area affected by each treatment of the grazing system.

** Short-term (ST) impacts on vegetation would occur immediately after the proposal was implemented on a management unit and would last one to two years after each grazing treatment is applied. Long-term (LT) impacts would begin to occur within 20 years after implementation of the proposal and would remain in effect as long as the grazing system was maintained.

*** Temporary removal of vegetation from production would last three to ten years.

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
5C Clover Creek 120 Ac. NRL				No change		
6C San Luis Creek #1 55 Ac. NRL				No change		
7P Alder 1349 Ac. NRL	Total	Utilize 30%-40% of forage in late spring	LT	Range condition would slowly decline.	--	--
8C San Luis Creek #3 220 Ac. NRL				No change		
9E Turquoise Gulch 3806 Ac. NRL	1/3	Utilize 40%-60% of forage in late spring and mid-summer.	ST	Vigor, reproduction, and litter reduced.	--	--
	1/3	Utilize 40%-50% of forage in summer.	ST	Reproduction and litter reduced; vigor increased.		
	1/3	Utilize 30%-40% of forage in late summer and fall.	ST	Vigor, reproduction, seed trampling, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 970,200 lbs. to 1,728,000 lbs., a net increase of 757,800 lbs.		
10E Kelly Creek 6699 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and summer.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/3	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased; and litter accumulation reduced.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,018,800 lbs. to 1,620,000 lbs., a net increase of 601,200 lbs.		
11P Kerber Creek 4500 Ac. NRL	2/5	Utilize 60%-80% of forage in late spring and summer.	ST	Vigor, reproduction, and litter accumulation reduced.	10.5	1.6
	2/5	Utilize 30%-50% of forage in late summer.	ST	Vigor, reproduction, and seed trampling increased.		
	1/5	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seeding establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 493,200 lbs. to 900,000 lbs., a net increase of 406,800 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
12C South Kerber Creek 760 Ac. NRL				No change		
13C North Kerber Creek 180 Ac. NRL				No change		
14E Noland Gulch 7650 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and summer.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/3	Utilize 30%-50% of forage in summer and early fall.	ST	Vigor, reproduction, and seed trampling increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 30%; composition of cool-season species increased; range condition improved, and vegetal production increased from 973,800 lbs., to 1,620,000 lbs., a net increase of 646,200 lbs.		
15P Nye 1460 Ac. NRL	Total Unit	Utilize 40%-50% of forage in summer for 2 years.	ST	Maintain vigor and litter accumulation.	0.85	0.03
		Rest from livestock grazing every 3rd year.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
		Implement grazing management; reduce livestock grazing by 15%.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 91,800 lbs. to 306,000 lbs., a net increase of 214,200 lbs.		
16P East & West San Luis Creek 2740 Ac. NRL	1/3	Utilize 40%-60% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	3.7	0.72
	1/3	Utilize 40%-60% of forage in mid-summe.	ST	Vigor increased, reproduction and litter accumulation reduced.		
	1/3	Utilize 40%-60% of forage in late summer.	ST	Vigor, seed trampling, and reproduction increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 471,600 lbs. to 756,000 lbs., a net increase of 284,400 lbs.		
17C Section 35 Tract 160 Ac. NRL				No change		
18C Junction 200 Ac. NRL				No change		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
19C Section 13 Tract 80 Ac. NRL				No change		
20U Unallotted 280 Ac. NRL				No change		
21C Silver Creek 200 Ac. NRL				No change		
22P Piney Creek 2510 Ac. NRL	1/2	Utilize 40%-60% of forage from mid-spring to mid-summer.	ST	Vigor and reproduction reduced.	1.66	0.75
	1/2	Utilize 40%-50% of forage from mid-summer to early fall.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased; hedging on browse increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased increased from 307,800 lbs. to 810,000 lbs., a net increase of 502,200 lbs.		
23P Steel Canyon 4472 Ac. NRL	1/2	Utilize 40%-60% of forage in late spring and early summer.	ST	Vigor and reproduction reduced.	2.1	0.63
	1/2	Utilize 40%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased. range condition improved, and vegetal production increased from 378,000 lbs. to 900,000 lbs., a net increase of 522,000 lbs.		
24P Mirage 2395 Ac. NRL	1/2	Utilize 40%-60% of forage in late spring and early summer.	ST	Vigor and reproduction reduced.	2.75	0.55
	1/2	Utilize 40%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased; hedging on browse increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 17% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 336,600 lbs. to 540,000 lbs., a net increase of 203,400 lbs.		
25E Valley View Hot Springs 4927 Ac. NRL	1/3	Utilize 40%-60% of forage in early summer.	ST	Reproduction and litter accumulation reduced; vigor increased.	--	--
	1/3	Utilize 40%-60% of forage in mid-summer.	ST	Litter accumulation reduced; seed trampling and vigor increased.		
	1/3	Utilize 40%-60% of forage in early fall.	ST	Vigor, reproduction, and seedling establishment increased; hedging on browse increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 768,600 lbs., to 1,080,000 lbs., a net increase of 311,400 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres) Temporary***	Permanent
26Eg Garner Creek and 27Eg South 680 Ac. NRL	Total Unit	Reduce livestock grazing 100%.	LT	Vigor, reproduction, and litter accumulation increased; ground cover and vegetal production increased; and range condition improved.	1.0	--
28P Cotton Creek 3880 Ac. NRL	1/3	Utilize 60%-80% of forage in early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	4.8	1.0
	1/3	Utilize 30%-50% of forage in mid-summer.	ST	Vigor, reproduction, and seed trampling increased; litter accumulation reduced.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 561,600 lbs., to 990,000 lbs., a net increase of 428,400 lbs.		
29C Rito Alto 800 Ac. NRL				No change		
30C San Isabel Creek 700 Ac. NRL				No change		
31P Hutchinson 835 Ac. NRL	1/3	Utilize 60%-80% of forage in mid-spring, summer, and early fall.	ST	Vigor, reproduction, and litter accumulation reduced.	1.1	0.5
	1/3	Utilize 30%-50% of forage in fall and mid-winter.	ST	Vigor, reproduction, and seed trampling increased; and hedging on browse species increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and eliminate early spring grazing with horses.	LT	Ground cover increased from 15% to 25%, range condition improved, and vegetal production increased from 138,600 lbs. to 180,000 lbs., a net increase of 41,400 lbs.		
32U Unallotted 40 Ac. NRL				No change		
33U Unallotted 400 Ac. NRL				No change		
34P Mineral Hot Springs 10,260 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/3	Utilize 30%-50% of forage in mid-summer.	ST	Vigor, reproduction, and seed trampling increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 1,854,000 lbs., to 2,610,000 lbs., a net increase of 756,000 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
35U Unallotted 160 Ac. NRL				No change		
36P McIntyre Gulch 4602 Ac. NRL	1/3	Utilize 60%-70% of forage in early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging of browse increased	1.8	0.6
	1/3	Utilize 60%-70% of forage in mid-fall.	ST	Vigor, reproduction, and seedling establishment increased; hedging of browse increased and vigor of browse reduced.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species and total ground cover increased; vegetal production increased from 559,800 lbs. to 990,000 lbs., a net increase of 430,200 lbs.		
37U Unallotted 680 Ac. NRL				No change		
38U Unallotted				No change		
39P Findley Gulch 11,345 Ac. NRL	1/3	Utilize 60%-80% of forage in summer.	ST	Reproduction and litter accumulation reduced.	6.3	3.4
	1/3	Utilize 30%-50% of forage in early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 32%.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 1,355,400 lbs. to 1,890,000 lbs., a net increase of 534,600 lbs.		
40C Calvert Fenced F.R. 1220 Ac. NRL				No change		
41P Laughlin Gulch 6643 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	1.6	0.8
	1/3	Utilize 30%-50% of forage in late summer and early fall	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 10% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 815,400 lbs. to 1,440,000 lbs., a net increase of 624,600 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
42P Poison Gulch 14,357 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	4.0	1.3
	1/3	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 29%.	LT	Ground cover increased from 15% to 30%, composition of cool-season species increased, from 1,719,000 lbs. to 2,700,000 lbs., a net increase of 981,000		
43C Ward Fenced Tract 60 Ac. NRL				No change		
44C Indian Creek 120 Ac. NRL				No change		
45P Cross Creek 6305 Ac. NRL	1/4	Utilize 20%-30% of forage in early summer.	ST	Litter accumulation reduced and vigor increased.	5.3	2.3
	1/2	Utilize 50%-60% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling increased; hedging on browse increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 541,800 lbs. to 1,170,000 lbs., a net increase of 628,200 lbs.		
46P Trickle Mountain 19,562 Ac. NRL	1/4	Utilize 60%-70% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	5.7	2.2
	1/4	Utilize 50%-60% of forage in summer.	ST	Reproduction and litter accumulation reduced.		
	1/4	Utilize 30%-40% of forage in fall.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased; hedging on browse increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 35%.	LT	Ground cover increased from 10% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,396,800 lbs. to 3,240,000 lbs., a net increase of 1,843,200 lbs.		
47P Sheep Creek 2031 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late summer and early fall.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.	5.3	2.3
		Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 286,200 lbs. to 450,000 lbs.; a net increase of 163,800 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
48P Taylor Canyon 2902 Ac. NRL	Total Unit	Utilize 40%-60% of forage in mid-fall.	ST	Vigor, reproduction, and litter accumulation increased; hedging and browse increased.	--	--
		Implement grazing management	LT	Ground cover increased from 13% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 441,000 lbs. to 576,000 lbs., a net increase of 135,000 lbs.		
49C Meadow Fenced 330 Ac. NRL				No change		
50P Rabbit Canyon 3835 Ac. NRL	1/2	Utilize 40%-60% of forage in mid- to late spring.	ST	Vigor reduced, reproduction maintained, and early use of browse increased.	1.5	1.1
	1/2	Utilize 40%-60% of forage in mid- to late fall.	ST	Vigor, reproduction, and litter accumulation increased. Hedging effect created by increased browsing.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 525,600 lbs. to 630,000 lbs., a net increase of 104,400 lbs.		
51E Saguache Park 1920 Ac. NRL	1/4	Utilize 50%-60% of forage in late spring.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/4	Utilize 60%-80% of forage in summer.	ST	Reproduction and litter accumulation reduced; vigor maintained		
	1/4	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging of browse increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 214,200 lbs. to 360,000 lbs., a net of 145,800 lbs.		
52P Hat Springs 4564 Ac. NRL	Total Unit	Utilize 40%-60% of forage in early and mid-fall.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased; hedging of browse increased.	1.5	0.07
		Implement grazing management.	LT	Composition of cool-season species increased, and vegetal production increased from 581,400 lbs. to 738,000 lbs., a net increase of 156,600 lbs.		
53P Robb Ranch 1488 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late fall and early winter.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased. Hedging of browse increased.	--	--
		Implement grazing management.	LT	Ground cover increased from 24% to 35%, composition of cool-season species increased, and vegetal production increased from 203,400 lbs. to 288,000 lbs., a net increase of 84,600 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
54C Mesa 960 Ac. NRL				No change		
55P Mill Hill 4167 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and summer.	ST	Vigor, reproduction, and litter accumulation reduced.	3.1	1.2
	1/3	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging of browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 473,400 lbs. to 738,000 lbs., a net increase of 264,600 lbs.		
56P Higgins Spring 753 Ac. NRL	1/2	Utilize 60%-80% of forage in summer.	ST	Reproduction and litter accumulation reduced.	1.0	0.8
	1/2	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	Total Unit	Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, litter accumulation, reproduction, and seedling establishment increased.		
		Implement grazing management.	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 88,200 lbs. to 144,000 lbs., a net increase of 55,800 lbs.		
57P Mitchell 938 Ac. NRL	Total Unit	Utilize 40%-60% of forage in early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	--	--
		Rest from livestock grazing yearlong 2 years out of 3.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management and reduce livestock grazing by 50%.	LT	Composition of cool-season species increased; range condition improved; and vegetal production increased from 14,400 lbs. to 144,000 lbs., a net increase of 129,600 lbs.		
58P West Tracy Ridge 925 Ac. NRL	Total Unit	Utilize 40%-60% of forage late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	--	--
		Rest from livestock grazing yearlong 2 years out of 3.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management and reduce livestock grazing by 40%.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 28,800 lbs., to 108,000 lbs., a net increase of 79,200 lbs.		
59P Tracy Ridge 893 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling, litter accumulation, and seedling establishment increased; browse species hedged.	--	--
		Implement grazing management	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition, improved, and vegetal production increased from 81,000 lbs. to 162,000 lbs., a net increase of 81,000 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres) Temporary***	Permanent
60P Tracy Cattlemen's 28,049 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and summer.	ST	Vigor, reproduction, and litter accumulation reduced.	8.97	2.45
	1/3	Utilize 30%-50% of forage in late summer, fall, and mid-winter.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 5,124,600 lbs. to 6,030,000 lbs., a net increase of 905,400 lbs.		
61P Tracy Individual 1676 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late summer and early fall.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased. Hedging on browse species increased.	--	--
		Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 180,000 lbs. to 324,000 lbs., a net increase of 144,000 lbs.		
62U Unallotted 1500 Ac. NRL				No change		
63P Biedell Creek 2462 Ac. NRL	1/3	Utilize 60%-80% of forage in summer.	ST	Reproduction and litter accumulation reduced.	--	--
	1/3	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 20% to 35%, composition of cool-season species increased, and vegetal production increased from 309,600 lbs., to 450,000 lbs., a net increase of 140,400 lbs.		
64P East of Carnero Creek 11,849 Ac. NRL	1/4	Utilize 60%-70% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	9.88	4.2
	1/4	Utilize 50%-60% of forage in mid-summer.	ST	Vigor increased, reproduction and litter accumulation reduced.		
	1/4	Utilize 30%-40% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased. Hedging on browse increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 10%-20% to 25%-30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,134,000 lbs. to 2,160,000 lbs., a net increase of 1,026,000 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
65P Upper Coolbroth 1780 Ac. NRL	Total Unit	Utilize 40%-60% of forage in mid- and late summer.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased.	--	--
		Implement grazing management and reduce livestock grazing by 37%.	LT	Ground cover increased from 15% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 133,200 lbs. to 252,000 lbs., a net increase of 118,800 lbs.		
6 6P Lower Coolbroth 605 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late summer.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased.	--	--
		Implement grazing management.	LT	Ground cover increased from 15% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 52,200 lbs. to 108,000 lbs., a net increase of 55,800 lbs.		
67P Carnero Creek 2318 Ac. NRL	Total Unit	Utilize 40%-60% of forage in early fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	--	--
		Implement grazing management.		Ground cover increased from 10% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 187,200 lbs. to 432,000 lbs., a net increase of 244,800 lbs.		
68P La Garita 1082 AC.	Total Unit	Utilize 40%-60% of forage in mid-fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	--	--
		Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 131,400 lbs. to 216,000 lbs., a net increase of 84,600 lbs.		
69P Elephant Rocks 3517 Ac. NRL	1/2	Utilize 40%-60% of forage in mid-fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	--	--
	1/2	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 56%.	LT	Ground cover increased from 55% to 70%, composition of cool-season species increased, range condition improved, and vegetal production increased from 167,400 lbs. to 450,000 lbs., a net increase of 282,600 lbs.		
70P Rio Grande Canal 4360 Ac. NRL	1/3	Utilize 60%-80% of forage in early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/3	Utilize 30%-50% of forage in mid-fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 55% to 65%, composition of cool-season species increased, range condition improved, and vegetal production increased from 405,000 lbs. to 540,000 lbs., a net increase of 135,000 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
71C Indian Head 800 Ac. NRL				No change		
72C County Line 200 Ac. NRL				No change		
73P Alder Creek 275 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late spring for 1 year.	ST	Vigor, reproduction, and litter accumulation reduced.	0.45	0.2
		Utilize 40%-60% of forage in early fall for 1 year.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
		Rest from livestock grazing every 3rd year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 23,400 lbs. to 54,000 lbs., a net increase of 30,600 lbs.		
74Eg Masonic Park 400 Ac. NRL	Total Unit	Eliminate livestock grazing.	ST LT	Vigor, reproduction, and litter accumulation increased. Ground cover gradually increased, composition of cool-season species increased.	--	--
75C Shaw Creek 640 Ac. NRL				No change		
76P Sanderson 510 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late spring 2 years in a row.	ST	Vigor, reproduction, and litter accumulation reduced.	7.8	0.4
		Rest from livestock grazing every 3rd year.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
		Implement grazing management.	LT	Present ground cover maintained, composition of warm-season species increased, and range condition not expected to change.		
77P Bowen 488 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late summer and early fall.	ST	Vigor, reproduction, litter accumulation, and seed trampling increased; hedging on browse increased.	--	--
		Implement grazing management and reduce livestock grazing by 30%.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 37,800 lbs. to 90,000 lbs., a net increase of 52,200 lbs.		
78P Schrader Creek 640 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late summer and early fall.	ST	Vigor, reproduction, litter accumulation, and seed trampling increased; hedging on browse increased.	--	--
		Implement grazing management	LT	Ground cover increased from 14% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 75,600 lbs., to 126,000 lbs., a net increase of 50,400 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
79P Branch 2457 Ac.	Total Unit	Utilize 40%-60% of forage in late summer and early fall for 2 years.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased; hedging on browse increased.	--	--
		Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
		Implement grazing management and reduce livestock grazing by 32%.	LT	Ground cover increased, composition of cool-season species increased, range condition improved, and vegetal production increased from 171,000 lbs. to 324,000 lbs., a net increase of 153,000 lbs.		
80P Pup Peak 5002 Ac. NRL	3/4	Utilize 50%-70% of forage in mid-fall to early winter.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	26.2	4.36
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased 15%-25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 727,200 lbs. to 900,000 lbs., a net increase of 172,800 lbs.		
81P Limekiln 5050 Ac. NRL	3/4	Utilize 50%-70% of forage in late fall to late winter.	ST	Hedging on browse, vigor, reproduction, and seedling establishment increased.	33.8	4.8
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 14% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 666,000 lbs. to 900,000 lbs., a net increase of 234,000 lbs.		
82P Nicomodes 3080 Ac. NRL	1/3	Utilize 50%-70% of forage in late spring.	ST	Vigor, reproduction, and litter accumulation reduced.	4.52	1.63
	1/3	Utilize 50%-70% of forage in late fall and early winter.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 547,200 lbs. to 612,000 lbs., a net increase of 64,800 lbs.		
83P Raton Creek 3940 Ac. NRL	1/3	Utilize 60%-80% of forage in early to mid-summer.	ST	Vigor increased, reproduction and litter accumulation reduced.	1.58	0.58
	1/3	Utilize 30%-50% of forage mid- to late summer.	ST	Vigor, reproduction, and seed trampling increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seed trampling increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 16% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 696,600 lbs. to 792,000 lbs., a net increase of 95,400 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres) Temporary***	Permanent
84P Rock Creek 12,680 Ac. NRL	1/5	Utilize 50%-70% of forage in late summer.	ST	Vigor, reproduction, and seed trampling increased.	29.95	5.0
	3/5	Utilize 50%-70% of forage in fall and early winter.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.		
	1/5	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 2,064,600 lbs. to 2,592,000 lbs., a net increase of 527,400 lbs.		
85P McMahon 15,016 Ac. NRL	1/3	Utilize 40%-60% of forage in late spring to early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	2.98	0.76
	1/3	Utilize 50%-70% of forage early fall to late fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 2%.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 2,316,600 lbs. to 2,790,000 lbs., a net increase of 473,400 lbs.		
86P Greenie Mountain 8,114 Ac. NRL	1/3	Utilize 40%-60% of forage from mid-spring to early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	51.45	1.0
	1/3	Utilize 40%-60% of forage from early fall to late fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 20%.	LT	Ground cover increased from 14% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,076,400 lbs. to 1,260,000 lbs., a net increase of 183,600.		
87P Gato-Hutchinson 1960 Ac. NRL	Total Unit	Utilize 40%-60% of forage in late fall for 2 years.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	30.1	--
		Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 410,400 lbs. to 486,000 lbs., a net increase of 75,600 lbs.		
88P Triangle 3715 Ac.	Total Unit	Utilize 40%-60% of forage in late fall and early winter for 2 years.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	10.1	--
		Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 378,000 lbs to 756,000 lbs., a net increase of 378,000 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
89P Alamosa River 760 Ac. NRL	Total Unit	Utilize 40%-60% of forage in mid-fall for 3 years.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	3.0	--
		Rest from livestock grazing yearlong every 4th year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management.	LT	Ground cover increased from 15% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 54,000 lbs. to 144,000 lbs., a net increase of 90,000 lbs.		
90C Alamosa Prairie 320 Ac. NRL				No change		
91U Unallotted 360 Ac. NRL				No change		
92C Chicago Bogs 520 Ac. NR.				No change		
93P Posito Creek 4991 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	3.5	1.1
	1/3	Utilize 30%-50% of forage in mid-summer to early fall.	ST	Vigor, reproduction, and seed trampling increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 630,000 lbs. to 990,000 lbs., a net increase of 360,000 lbs.		
94P Jadero Flat 5200 Ac. NRL	2/3	Utilize 60%-65% of forage in late fall to late winter.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.	--	--
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 13% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 579,600 lbs. to 1,044,000 lbs., a net increase of 464,400 lbs.		
95P Poso Creek 2240 Ac. NRL	2/3	Utilize 60%-65% of forage in late fall to mid-winter.	ST	Vigor, reproduction, and seedling establishment increased; hedging on browse increased.	2.5	--
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 370,800 lbs. to 468,000 lbs., a net increase of 97,200 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres) Temporary***	Permanent
96P Capulin 5589 Ac. NRL	2/3	Utilize 60%-65% of forage in early fall to mid-winter.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	1.6	0.7
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, seedling establishment, and litter accumulation increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,056,600 lbs. to 1,116,000 lbs., a net increase of 59,400 lbs.		
97P Romero Canyon 1730 Ac. NRL	1/2	Utilize 40%-60% of forage in mid-summer.	ST	Reproduction and litter accumulation reduced.	1.3	0.5
	1/2	Utilize 40%-50% of forage in late summer.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 18% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 228,600 lbs., to 360,000 lbs., a net increase of 131,400 lbs.		
98P Ra Jadero Canyon 6730 Ac. NRL	1/3	Utilize 60%-80% of forage in mid-spring.	ST	Vigor, reproduction, and litter accumulation reduced.	3.2	--
	1/3	Utilize 30%-50% of forage from mid-summer to early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 13% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,117,800 lbs. to 1,440,000 lbs., a net increase of 322,200 lbs.		
99P Cinder Pits 15,370 Ac. NRL	2/3	Utilize 60%-65% of forage in late summer to early fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.	13.0	2.6
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 18% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 2,088,000 lbs. to 3,330,000 lbs., a net increase of 1,242,000 lbs.		
100E Ciscom Flat 3680 Ac. NRL	1/4	Utilize 60%-70% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/4	Utilize 50%-60% of forage in mid-summer.	ST	Vigor increased and reproduction reduced.		
	1/4	Utilize 30%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling, and litter accumulation increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 345,600 lbs. to 720,000 lbs., a net increase of 374,400 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cpmt/)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
101U Hot Creek 4520 Ac. NRL				No change		
102P La Jara Creek 820 Ac. NRL	Total Unit	Utilize 40%-50% of forage in mid-summer for 2 years.	ST	Vigor and reproduction increased; litter maintained.	--	--
		Utilize 40%-50% of forage in late summer and early fall for 1 year.	ST	Vigor, reproduction, seed trampling, litter accumulation, and seedling establishment increased.		
		Rest from livestock grazing yearlong every 4th year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management and reduce livestock grazing by 38%.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 54,000 lbs., to 108,000 lbs., a net increase of 54,000 lbs.		
103C Del Rancho 160 Ac. NRL				No change		
104Eg La Jara Canyon 275 Ac. NRL	Total Unit	Eliminate livestock grazing.	LT	Ground cover increased; vegetal production increased 10%-20%.	--	--
105Eg Pastures 370 Ac. NRL	Total Unit	Eliminate livestock grazing.	LT	Ground cover increased and vegetal production increased 10%-20%.	--	--
106P Little Mogotes 13,510 Ac. NRL	1/3	Utilize 60%-80% of forage in early spring.	ST	Vigor, reproduction, and litter accumulation reduced.	23.2	10.5
	1/3	Utilize 30%-50% of forage in early fall to mid-winter.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 19% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 2,599,200 lbs. to 3,060,000 lbs., a net increase of 468,800 lbs.		
107P Grande 3950 Ac. NRL	1/3	Utilize 60%-70% of forage in early spring.	ST	Vigor, reproduction, and litter accumulation reduced.	3.3	--
	1/3	Utilize 30%-40% of forage in early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 6%.	LT	Ground cover increased from 20% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 784,800 lbs. to 936,000 lbs., an increase of 151,200 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
108P Mogote Flat 1977 Ac. NRL	1/2	Utilize 40%-60% of forage in late spring.	ST	Vigor and reproduction reduced.	20.5	0.2
	1/2	Utilize 40%-50% of forage in early fall.	ST	Vigor, reproduction, seed trampling, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15%-20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 370,800 lbs. to 504,000 lbs., a net increase of 133,200 lbs.		
109P Poso 5240 Ac. NRL	1/2	Utilize 40%-60% of forage in late spring.	ST	Vigor and reproduction reduced.	4.65	1.55
	1/2	Utilize 40%-50% of forage in early fall.	ST	Vigor, reproduction, seed trampling, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management	LT	Ground cover increased from 20% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 496,800 lbs. to 936,000 lbs., a net increase of 439,200 lbs.		
110P Los Mogotes 7514 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring and early summer.	ST	Vigor, reproduction, and litter accumulation reduced	7.65	2.05
	1/3	Utilize 30%-50% of forage in mid-summer and late summer.	ST	Vigor, reproduction, and seed trampling increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,173,600 lbs. to 1,440,000 lbs., a net increase of 266,400 lbs.		
111P Big Horn Creek 760 Ac. NRL	Total Unit	Utilize 40%-50% of forage in early spring for 1 year.	ST	Vigor and reproduction reduced.	1.0	0.1
		Utilize 30%-40% of forage in late fall for 1 year.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
		Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management.	LT	Ground cover increased from 20% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 106,200 lbs. to 180,000 lbs., a net increase of 73,800 lbs.		
112P Railroad 3741 Ac. NRL	2/3	Utilize 50%-70% of forage in late fall and early winter.	ST	Vigor, reproduction, and seedling establishment increased; hedging on browse increased.	6.0	--
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 30%.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 286,200 lbs., to 720,000 lbs., a net increase of 433,800 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
113P Llano 5261 Ac. NRL	2/3	Utilize 50%-70% of forage in late fall and early winter.	ST	Vigor, reproduction, and litter accumulation reduced; hedging on browse increased.	5.0	--
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 21%.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 270,000 lbs., to 900,000 lbs., a net increase of 630,000 lbs.		
114U Unallotted 480 Ac. NRL				No change		
115P Alta Lake 11,446 Ac. NRL	3/4	Utilize 50%-70% of forage in late fall to late winter.	ST	Vigor, reproduction, and seedling establishment increased; hedging on browse increased.	11.0	3.0
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 12% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,035,000 to 2,160,000 lbs., a net increase of 1,125,000 lbs.		
116E Twin Lakes 8153 Ac. NRL	1/2	Utilize 50%-70% of forage in mid-winter to late winter.	ST	Vigor, reproduction, and seedling establishment increased; hedging on browse increased.	--	--
	1/4	Utilize 40%-60% of forage in late winter to mid-spring.	ST	Vigor reduced and hedging on browse increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,175,400 lbs. to 1,620,000 lbs., a net increase of 44,600 lbs.		
117P River 2324 Ac. NRL	2/3	Utilize 50%-70% of forage in late fall and early winter.	ST	Vigor and reproduction increased; hedging on browse increased.	2.3	0.8
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 20% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 360,000 lbs. to 504,000 lbs., a net increase of 144,000 lbs.		
118Eg Mondragon Individual 385 Ac. NRL	Total Unit	Eliminate livestock grazing.	LT	Ground cover increased.	1.0	--

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres) Temporary***	Permanent
119P South Valley 1800 Ac. NRL	Total Unit	Utilize 40%-50% of forage in winter for 2 years.	ST	Vigor and reproduction increased; hedging on browse increased.	1.1	1.0
		Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management.	LT	Ground cover increased from 15% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 163,800 lbs., to 324,000 lbs., a net increase of 160,200 lbs.		
120P Pinon 7210 Ac. NRL	1/4	Utilize 50%-70% of forage in mid-spring to early summer.	ST	Vigor, reproduction, and litter accumulation reduced.	4.0	1.4
	1/2	Utilize 50%-70% of forage in fall and winter.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/4	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 707,400 lbs. to 1,080,000 lbs., a net increase of 372,600 lbs.		
121E Kiowa Hills 4302 Ac. NRL	1/3	Utilize 60%-80% of forage in late spring.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/3	Utilize 30%-50% of forage in fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 374,400 lbs., to 774,000 lbs., a net increase of 399,600 lbs.		
122P Braiden 960 Ac. NRL	Total Unit	Utilize 40%-50% of forage in fall for 2 years.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	--	--
		Rest from livestock grazing yearlong every 3rd year.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
		Implement grazing management and reduce livestock grazing by 20%.	LT	Ground cover increased from 20% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 108,000 lbs. to 180,000 lbs., a net increase of 72,000 lbs.		
123P Eight Mile 5640 Ac. NRL	2/3	Utilize 50%-70% of forage mid-fall through mid-winter.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	7.0	2.2
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 11%.	LT	Ground cover increased from 21% to 40%, composition of cool-season species increased, range condition improved, and vegetal production increased from 381,600 lbs. 936,000 lbs., a net increase of 554,400 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
124P Pinon Hills 9274 Ac. NRL	2/3	Utilize 50%-70% of forage in early fall to mid-winter.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	3.2	0.2
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 19% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 703,800 lbs., to 1,188,000 lbs., a net increase of 484,200 lbs.		
125P Rio Grande Common 18,611 Ac. NRL	2/3	Utilize 50%-70% of forage in early fall to mid-winter.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	19.2	5.2
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 12%.	LT	Ground cover increased from 20% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 1,508,400 lbs., to 2,790,000 lbs., a net increase of 1,281,600 lbs.		
126P La Sauses 3200 Ac. NRL	2/3	Utilize 50%-70% of forage in early and mid-fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	2.65	1.05
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 9%.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 320,400 lbs. to 468,000 lbs., a net increase of 237,600 lbs.		
127Eg Saddle-back Mountain 2720 Ac. NRL	Total Unit	Eliminate livestock grazing.	LT	Ground cover increased.	0.1	--
128C Oxbow 120 Ac. NRL				No change		
129P Rio Grande 2975 Ac. NRL	1/2	Utilize 40%-60% of forage in late spring.	ST	Vigor, reproduction, and litter accumulation reduced.	2.9	0.8
	1/2	Utilize 40%-50% of forage in early summer.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased.		
	Total Unit	Implement grazing management	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 176,400 lbs., to 540,000 lbs., a net increase of 363,600 lbs.		
130C Allot-ment B 160 Ac. NRL				No change		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
131U Emperius 160 Ac. NRL				No change		
132P Four Mile 320 Ac. NRL	Total Unit	Utilize 40%-50% of forage in late summer and early fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased.	0.33	--
		Implement grazing management.	LT	Composition of cool-season species increased, range condition improved, and vegetal production increased from 32,400 lbs. to 54,000 lbs., a net increase of 21,600 lbs.		
133P Tobin Creek 6126 Ac. NRL	Total Unit	Utilize 40%-60% of forage in fall and winter.	ST	Vigor and reproduction increased; hedging on browse increased.	2.3	0.07
		Implement grazing management.	LT	Composition of cool-season species increased, browse condition reduced, and vegetal production increased from 423,000 lbs. to 1,080,000 lbs., a net increase of 657,000 lbs.		
134P Foothills 4700 Ac. NRL	1/2	Utilize 40%-60% of forage in mid-spring to mid-summer.	ST	Vigor, reproduction and litter accumulation reduced.	3.1	2.3
	1/2	Utilize 40%-50% of forage in mid-summer to early fall.	ST	Vigor, reproduction, seed trampling, and seedling establishment increased; hedging on browse increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 8%.	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 462,600 lbs. to 900,000 lbs., a net increase of 437,400 lbs.		
135C Dow 480 Ac. NRL				No change		
136C Phiffer Pasture 160 Ac. NRL				No change		
137P Blanca 5220 Ac. NRL	1/5	Utilize 40%-50% of forage in late summer.	ST	Vigor, reproduction, and seed trampling increased.	4.3	1.3
	4/5	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total	Implement grazing management and reduce	LT	Ground cover increased from 15% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 86,400 lbs., to 954,000 lbs., a net increase of 867,600 lbs.		
138P Dry Lakes 5836 Ac. NRL	2/3	Utilize 50%-70% of forage in late summer through mid-fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.	2.8	1.6
	1/3	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 10% to 20%, composition of cool-season species increased, range condition improved, and vegetal production increased from 250,000 lbs. to 1,044,000 lbs., a net increase of 793,800 lbs.		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
139C Caldwell Pasture 280 Ac. NRL				No change		
140Eg Park Pasture 400 Ac. NRL	Total Unit	Eliminate livestock grazing.		Ground cover increased.	0.6	0.1
141P Zapata Falls 5991 Ac. NRL	1/2	Utilize 40%-60% of forage in late spring.	ST	Vigor and reproduction reduced, hedging on browse increased.	2.2	0.55
	1/2	Utilize 40%-50% of forage in early fall.	ST	Vigor, reproduction, and seed trampling increased; hedging on browse increased.		
	Total Unit	Implement grazing management and reduce livestock grazing by 17%.	LT	Ground cover increased from 20% to 30%, composition of cool-season species increased, range condition improved, and vegetal production increased from 441,000 lbs. to 864,000 lbs., a net increase of 423,000 lbs.		
142C Bachelor Lake 320 Ac. NRL				No change		
143C Spring Pasture 600 Ac. NRL				No change		
144C Sand Pasture 280 Ac. NRL				No change		
145C Crow Pasture 1040 Ac. NRL				No change		
146C Section 15 Lease 240 Ac. NRL				No change		
147C Section 15 Lease 140 Ac. NRL				No change		
148Eg North Pasture 700 Ac. NRL	Total Unit	Eliminate livestock grazing.		Ground cover increased.	--	--

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres) Temporary***	Permanent
149U Unallotted 200 Ac. NRL				No change		
150C Dry Lakes 800 Ac. NRL				No change		
151U Unallotted 1680 Ac. NRL				No change		
152U Unallotted 80 Ac. NRL				No change		
153U Unallotted 600 Ac. NRL				No change		
154U Unallotted 80 Ac. NRL				No change		
155U Unallotted 80 Ac. NRL				No change		
156U Unallotted 80 Ac. NRL				No change		
157U Unallotted 360 Ac. NRL				No change		
158U Unallotted 80 Ac. NRL				No change		
159E Klondyke 1169 Ac. NRL	3/5	Utilize 50%-60% of forage in early and mid-summer.	ST	Vigor, reproduction, and litter accumulation reduced.	--	--
	1/5	Utilize 30%-50% of forage in late summer.	ST	Vigor, reproduction, and seed trampling increased.		
	1/5	Rest from livestock grazing yearlong.	ST	Vigor, reproduction, litter accumulation, and seedling establishment increased.		
	Total Unit	Implement grazing management.	LT	Ground cover increased from 15% to 25%, composition of cool-season species increased, range condition improved, and vegetal production increased from 84,600 lbs. to 216,000 lbs., a net increase of 131,400 lbs.		
160C Phone Line 800 Ac. NRL				No change		
161C Big East 1440 Ac. NRL				No change		

TABLE III-5. IMPACTS ON VEGETATION (cont.)

Management Unit	Area Affected*	Cause	Length of Impact**	Impacts	Vegetation Removed from Production with Implementation of Range Improvement (Acres)	
					Temporary***	Permanent
162C Hell Gate 800 Ac. NRL				No change		
163C Sheep Trail 280 Ac. NRL				No change		
164U Terrace Lakes 600 Ac. NRL				No change		
165U Bonanza 1380 Ac. NRL				No change		

Wildlife

Implementation of the proposed grazing management systems would have some general impacts on wildlife throughout the resource area due to the following improvements in vegetative condition: increases in plant vigor, ground cover, and species composition of plants desirable for wildlife food and cover. This improvement in vegetative condition would vary, depending on the extent of the existing deterioration (if any) and the severity of the change proposed in the system. The expected change in vegetative condition is evaluated for each allotment in table III-5 (p. III-22 f.) in the preceding section, which described impacts on terrestrial vegetation.

Table III-6 (pp.III-50 f.) describes the specific impacts of the proposed AMPs and elimination of grazing on the wildlife habitat in each management unit. Custodial and unallotted management units are not listed as no impacts were identified. It was not possible to quantify impacts on wild animal populations for each allotment since reliable population estimates were not available by allotment. This situation is further complicated by the mobility of most wild animals.

Table III-6 (pp.III-50 f.) includes the following information on wildlife habitat in each allotment. The second column identifies the big-game management units that would be impacted by the allotment concerned and the relative importance of the habitat provided by the allotment to the big-game population of the management unit. Management units 68, 79, 80, 81, and 82 are deer and elk management units. Those preceded by an A are antelope management units. S-10 is the only bighorn sheep unit that would be affected. (Figures II-17, II-20, II-21, and II-24 (pp. II-97, II-108, II-115, and II-125, respectively) show the boundaries of these management units.) The second column also gives codes representing the relative importance of the habitat of the allotments to the management units. C designates crucial habitat; I designates important habitat; L, habitat of little importance; and N, insignificant habitat. For example, 68:C means that the allotment's habitat is crucial to deer and elk Unit 68; A-74:I indicates that the habitat is important to antelope Unit 74; S-10:L indicates that the habitat is of little importance to bighorn sheep Unit 10; and 81:N indicates that the habitat is insignificant to deer and elk Unit 81. This information is noted for reference to table III-7 (p. III-62) in which the cumulative impacts on the big-game herds are quantified for each game management unit.

The third column in table III-6 (pp. III-50 f.) shows the anticipated changes in wildlife habitat condition which would be expected from the proposed action in each allotment. These changes are classified relatively as low, moderate, or high; and plus (+), static, or minus (-)--which indicate improvement, no change, or deterioration, respectively. These changes are based on the impacts on vegetation which are quantified by allotment in table III-5 (pp. III-22 f.) in the preceding section. The general impacts on wildlife described later in this section would be proportional to these changes. The fourth column relates to those specific impacts which have been identified for each allotment. Projected changes in forage availability to big game are estimated as slight (less than 25 percent), moderate (26 to 50 percent), and large (more than 50 percent). Existing and projected riparian habitat conditions are rated as poor, fair, good, and excellent in accordance with the criteria indicated in table II-34 (p. II-143 f.).

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
1P Poncha Pass - West	68:I, A-74:L	Moderate +	32% reduction in AUMs would provide a moderate increase in forage for deer, elk, and antelope; slight competition.
2E Poncha Pass East	82:I, A-74:C	Moderate +	Moderate increase in forage for deer, elk, and antelope; 3 miles poor-grade riparian habitat would improve some, but could remain overused by livestock; slight competition with deer, elk, and antelope.
2E East Side	82:C, A-74:C	Low +	Slight increase in forage for deer, elk, and antelope; slight competition now.
4P West Clover Creek	68 & A-74:L	Moderate +	40% reduction in AUMs would provide a moderate increase in forage for deer, elk, and antelope; slight competition now.
7P Alder	68 & A-74:L	Low +	Slight increase in forage for deer, elk, and antelope; slight competition now.
9E Turquoise Gulch	68 & A-74:I	Static	Maintain excellent forage for deer, elk, and antelope; slight competition.
10E Kelly Creek	68 & A-74:I	Moderate +	Moderate increase in forage for deer, elk, and antelope; slight competition now.
11P Kerber Creek	68:L, A-74:N	Moderate +	Moderate increase in forage for deer, and elk; reduce competition to slight; 10% reduction in AUMs.
14E Noland Gulch	68:L, A-74:I	Moderate +	Moderate increase in forage for deer, elk, and antelope; reduce competition to slight.
15P Nye	68:N, A-74L	Moderate +	15% reduction in AUMs would provide a moderate increase in forage for antelope; competition slight; modification of 3.75 miles woven-wire fence with antelope passes would highly benefit antelope.
16P East & West San Luis Creek	68:N, A-74:L	Low +	Slight increase in forage for antelope; competition slight now.
22P Piney Creek	82:I, A-74:I	Low +	Slight increase in forage for deer, elk, and antelope; competition slight now.
23P Steel Canyon	82:C, A-74:C	Low +	Slight increase in forage for deer, elk, and antelope; competition slight now.
24P Mirage	82:L, A-74:I	Low +	Slight increase in forage for antelope; competition slight now.
25E Valley View Hot Springs	82:C, A-74:I	Low +	Slight increase in forage for deer, elk, and antelope; competition slight now.
26Eg Garner Creek	82:C	Moderate +	Elimination of 10 AUMs on allotment would reserve all forage for wildlife.
27Eg South	82:C	Moderate +	Elimination of 20 AUMs on allotment would reserve all forage for wildlife.
28P Cotton Creek	82:I, A-74:C	Moderate +	Moderate increase in forage for antelope and deer; competition slight now; riparian habitat along Cotton Creek would remain good to excellent.

*C = Crucial habitat, I = important habitat, L = habitat of little importance, N = insignificant habitat.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name		Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
			On Wildlife Habitat	Description
31P	Hutchinson	82:I, A-74:L	Low +	Elimination of spring horse use would provide a slight increase in deer and antelope forage; remaining horse use (6/1-2/28) could cause significant browsing and competition with deer.
34P	Mineral Hot Springs	68:I, A-74:I	High +	Significant improvement in range condition would increase forage for deer, elk, and antelope proportionately and reduce competition to slight.
36P	McIntyre Gulch	68:L, A-73:L	Low +	Slight increase in forage for deer, elk, and antelope; late fall grazing could cause moderate competition with big game.
39P	Findley Gulch	68:I, A-73:I, S-10:L	High +	32% reduction in AUMs and elimination of fall and winter grazing would provide a large increase in forage for deer, elk, antelope, and bighorns; elimination of significant competition.
41P	Laughlin Gulch	68:I, A-73:I, S-10:L	Low +	Slight increase in forage for deer, elk, antelope, and Bighorn sheep; would reduce competition to slight.
42P	Poison Gulch	68:I, A-73:I, S-10:I	Moderate +	Redistribution of grazing would provide a moderate increase in forage for deer, elk, antelope, and bighorn sheep. Poor riparian habitat on lower Ford Creek would improve somewhat, but the creek bottom could remain overused.
45P	Cross Creek	68:I, A-73:I, S-10:I	Moderate +	Moderate increase in forage for deer, elk, antelope, and bighorn sheep.
46P	Trickle Mountain	68:I, A-73:C, S-10:C	High +	35% reduction in AUMs, redistribution of grazing, and 8 new water sources would provide a large increase in usable forage for deer, elk, antelope, and bighorn sheep. Eight new water souurces would also make new bighorn sheep lambing ranges available and thereby reduce the possibility of lungworn die-offs by reducing concentrations on existing lambing ranges.
47P	Sheep Creek	68:I, A-73:I, S-10:I	Low +	Slight increase in forage for deer, elk, antelope, and bighorn sheep. Riparian habitat on Sheep Creek would remain in good to excellent condition.
48P	Taylor Canyon	68:I, A-73:I, S-10:I	Moderate +	Change in season from spring to fall would provide a moderate increase in most forage, but late fall grazing could cause some browsing by cattle.
50P	Rabbit Canyon	68:L, A-B:L, S-10:L	Low +	Slight increase in forage for deer, elk, and antelope, but spring and late fall grazing could cause some remaining competition.
51E	Saguache Park	68:L, A-73:I	Low +	Existing AMP would gradually provide a slight increase in deer, elk, and antelope forage and reduce competition.
52P	Hat Springs	68:I, A-73:L	Low +	Slight increase in forage for deer and elk due to control of grazing distribution, but moderate competition for browse could remain. Poor to fair riparian habitat on Hat Springs Creek would probably not improve significantly since no rest is proposed.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
53P Robb Ranch	68:I, A-73:I, S-10:C	Static	Continuation of late fall-early winter grazing would maintain good to excellent forage for deer, elk, antelope, and bighorn sheep. Uplands in allotment are not used significantly in most years due to the attraction of Saguache Creek and adjacent wet meadows on private land.
55P Mill Hill	68:I, A-73:I	Low +	Slight increase in forage for deer, elk, and antelope; competition would remain slight.
56P Higgins Spring	68:L, A-73:N	Moderate +	Moderate increase in forage for deer and elk; reduce competition to slight.
57P Mitchell	68:L, A-73:N	High +	50% reduction in AUMs and rest 2 years out of 3 would cause a dramatic improvement in range condition and a moderate increase in forage for deer and elk. Competition would be reduced to slight.
58P West Tracy Ridge	68:L, A-73:N	Moderate +	40% reduction in AUMs would provide a moderate increase in forage for deer and elk and reduce competition to slight.
59P Tracy Ridge	68:L, A-73:N	Moderate +	Change of season from spring-summer to late summer-fall would provide a moderate increase in forage for deer and elk; competition slight now.
60P Tracy Cattlemen's	68:I	Moderate +	Redistribution of grazing and rest would provide a moderate increase in forage for deer and elk in some years, but winter sheep use in the higher elevation pastures could cause moderate competition for browse in some years.
61P Tracy Individual	68:I	Low +	Shortening season to late summer only would provide a slight increase in forage for deer and elk; competition slight now.
63P Biedell Creek	68:I	Moderate +	Moderate increase in forage for deer and elk; competition slight now.
64P East of Carnero Creek	68:I	Moderate +	Change in class and season from winter sheep to summer cattle would provide a large increase in forage for deer and elk and reduce competition to slight.
65P Upper Coolbroth	79:I	Moderate +	37% reduction in AUMs would provide a moderate increase in forage for deer and elk; competition slight now.
66P Lower Coolbroth	79:L	Low +	Slight increase in forage for deer and elk; slight competition now.
67P Carnero Creek	79:I	Static or low -	Allotment has not been used for several years. Resumption of fall sheep grazing could cause moderate competition with deer and elk for browse.
68P La Garita	79:L, A-76:N	Static or low -	This allotment has also not been used for several years and resumption of fall sheep grazing could cause moderate competition with deer and elk for browse.
69P Elephant Rocks	79:N, A-76:I	High +	56% reduction would provide a large increase in forage for antelope and reduce competition to slight.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
70P Rio Grande Canal	79:L, A-76:I	Low +	Resting 1 pasture would provide a slight increase in forage for antelope, but moderate competition could remain between sheep and antelope in the grazed pastures.
73P Alder Creek	79:I	Moderate +	Resting 1 year out of 3 would provide a slight increase in forage for deer and elk, and competition would remain slight.
74Eg Masonic Park	79:C	Low +	Elimination of 22 AUMs would provide a slight increase in forage for deer and elk, and eliminate any possible competition.
76P Sanderson	80:I	Low +	Resting 1 year out of 3 would provide a slight increase in forage for deer and elk, and competition would remain slight.
77P Bowen	80:I	Moderate +	30% reduction in AUMs and elimination of late fall grazing would provide a moderate increase in forage for deer and elk; competition would remain slight.
78P Schrader Creek	80:L	Moderate +	Change of season from spring to late summer would provide a slight increase in forage for deer and elk, and competition would remain slight.
79P Branch	80:I	Moderate +	32% reduction in AUMs and change from spring and fall use to late summer use would provide a slight increase in deer and elk forage. Allotment has not been used in recent years due to lack of fencing.
80P Pup Peak	80:L	Low +	Slight increase in deer and elk forage, but winter sheep use could cause moderate competition with deer and elk for browse.
81P Limekiln	80:I	Low +	Slight increase in deer forage; competition would remain slight.
82P Nicomodes	80:L	Low +	Slight increase in deer and elk forage, but spring sheep use could cause some minor competition with deer.
83P Raton Creek	80:I	Moderate +	Moderate increase in deer and elk forage, and competition would be reduced to slight
84P Rock Creek	80:C	Moderate +	Change in season from fall to late summer would provide a moderate increase in deer and elk forage and reduce competition somewhat. Some competition could remain between deer and sheep in the grazed pastures.
85P McMahon	80:C, A-77:I	Moderate +	Change in distribution of grazing would provide a slight increase in forage for deer, elk, and antelope. Moderate competition could remain between sheep and antelope and sheep and deer due to fall-winter sheep use. Three-quarters mile of good riparian habitat along the Alamosa River in the south pasture would remain good or improve to excellent.
86P Greenie Mountain	80:C, A-77:I	Moderate +	20% reduction in AUMs would provide a moderate increase in forage for deer, elk, and antelope and reduce competition significantly; but spring-fall use could still cause some competition with deer, elk, and antelope. Three new water sources would be extremely beneficial to antelope in the summer.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
87P Gato-Hutchinson	80:L, A-77:I	Moderate +	Rest 1 year of 3 would provide a moderate increase in forage for deer, elk, and antelope. Moderate competition could remain in the years grazed.
88P Triangle	80:I, A-77:	Moderate +	Rest 1 year of 3 would provide a moderate increase in forage for deer, elk, and antelope. Moderate competition could remain in the years grazed.
89P Alamosa River	81:N	Moderate +	Rest 1 year of 4 would provide a slight increase in forage for deer. Slight competition now.
93P Posito Creek	81:I	Low +	Good deer and elk forage would increase slightly. Competition slight now.
94P Jadero Flat	81:L	Moderate +	Rest 1 year of 3 would provide a slight increase in forage for deer and elk. Competition would remain slight.
95P Poso Creek	81:N, A-79:L	Moderate +	Rest 1 pasture each year would provide a slight increase in forage for antelope. Competition could remain with antelope in the grazed pastures.
96P Capulin	81:L, A-79:I	Moderate +	Rest 1 pasture each year would provide a moderate increase in forage for antelope, but moderate competition could remain in the grazed pastures. Three new water sources would highly benefit antelope. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
97P Romero Canyon	81:C	Moderate +	Deferment and improvement of grazing distribution would provide a moderate increase in deer and elk forage and reduce competition to slight.
98P Ra Jadero Canyon	81:C	High +	Change in season and class from summer-fall-winter sheep use to summer cattle use would provide a large increase in deer and elk forage and reduce competition to slight.
99P Cinder Pits	81:I, A-79:I	Moderate +	Change from fall-winter combined sheep and cattle use to fall cattle would provide a moderate increase in forage for deer, elk, and antelope and reduce competition to slight. Twelve new water sources would be extremely beneficial to wildlife, especially antelope. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
100E Ciscom Flat	81:L, A-79:I	Low +	Continuation of existing AMP would provide a slight increase in forage for antelope and competition would remain slight. Modification of the existing woven-wire boundary fence to allow for unrestricted antelope passage would highly benefit antelope. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
101U Hot Creek	81:C	Static	The base property for this allotment was purchased by the Colorado Division of Wildlife several years ago and the forage was all reserved for wildlife.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
102P La Jara Creek	81:I	Moderate +	38% reduction in AUMs, deferment of spring use to late summer, and resting 1 year in 4 would provide a moderate increase in deer and elk forage, and competition. would remain slight. Riparian habitat along 3 miles of La Jara Creek would remain good to excellent.
104Eg La Jara Canyon	81:C	Low +	Elimination of 18 AUMs would reserve all available forage for wildlife.
105Eg Pastures	81:C	Low +	Elimination of 21 AUMs would reserve all available forage for wildlife; riparian habitat along 1 mile of La Jara Creek could remain in good to excellent condition.
106P Little Mogotes	81:I, A-79:I	Moderate +	Change in distribution of grazing and rest rotation system would provide a moderate increase in forage for deer, elk, and antelope, especially in the rested pasture; but moderate competition would remain in the grazed pastures. Fourteen new water sources would highly benefit antelope, and improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
107P Grande	81:C, A-79:I	Moderate +	Grazing system would provide a moderate increase in forage for deer, elk, and antelope in the rested pasture each year, but moderate competition would remain in the grazed pastures. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
108P Mogote Flat	81:I, A-79:I	Low +	Grazing system would provide a slight increase in deer, elk, and antelope forage, but moderate competition would remain between sheep and big game. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
109P Poso	81:L, A-79:C	Moderate +	Change in season and class of use from fall-winter sheep to late spring-summer cattle could provide a moderate increase in forage for antelope and reduce competition to slight. Three new water sources would highly benefit antelope, and improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
110P Los Mogotes	81:C, A-79:I	Moderate +	Change from nearly yearlong sheep use to summer cattle on one allotment in this combination and the rest rotation system would provide a moderate increase in forage for deer, elk, and antelope. Four new water sources would benefit prairie dogs and possible black-footed ferrets.
111P Bighorn Creek	81:C	Moderate +	Grazing system would provide a moderate increase in forage for deer and elk in the years not grazed, but moderate competition could remain, especially for browse due to spring and fall grazing when it is used.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
112P Railroad	81:I	Moderate +	24% reduction in AUMs would provide a moderate increase in forage for deer and elk and reduce competition to slight.
113P Llano	81:L	Moderate +	21% reduction in AUMs and elimination of spring use would provide a slight increase in deer and elk forage. Competition is now slight.
115P Alta Lake	81:N, A-80:I	Moderate +	Grazing system would provide a moderate increase in forage for antelope. Modification of nearly 14 miles of woven-wire fence with antelope passes and 9 new water sources would all be highly beneficial to antelope. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets.
116E Twin Lakes	81:N, A-80:I	Moderate +	Continuation of existing grazing system would provide a moderate increase in forage for antelope. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets. Competition slight now.
117P River	81:L, A-80:L	Low +	Grazing system would provide a slight increase in forage for antelope and deer. Competition is slight now. Riparian habitat in 5 miles of the Rio Grande Canyon would remain in good to excellent condition due to inaccessability to cattle.
118Eg Mondragon	81:N, A-80:N	High +	Elimination of grazing on this allotment would dramatically improve range condition and provide a slight increase in deer and antelope forage. Riparian habitat along 1.5 miles of the Rio Grande would remain in good condition.
119P South Valley	81:L, A-80:L	Moderate +	Grazing system would provide a slight increase in forage for deer and antelope, and 1.5 miles of riparian habitat in the Rio Grande Canyon would remain in good condition due to inaccessability to cattle. Competition would be reduced to slight.
120P Pinon	81:L, A-80:I	Moderate +	Grazing system would provide a slight increase in forage for deer and antelope; but moderate competition could remain in the grazed pastures due to spring, fall, and winter sheep use. Riparian habitat along .25 mile of the Rio Grande would improve slightly but could remain overused by livestock. Improvement in range condition would benefit prairie dogs and possible black-footed ferrets. Four new water sources would benefit antelope and deer.
121E Kiowa Hill	81:N, A-80:L	Moderate +	Grazing system would provide a slight increase in forage for antelope and reduce competition to slight. Modification of woven wire fence around the allotment boundary with antelope passes would highly benefit antelope.
122P Braiden	81:N, A-80:N	Moderate +	Recalculation of percentage of federal range effectively reducing grazing pressure by 20% would provide a slight increase in antelope forage and reduce competition to slight.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
123P Eight Mile	81:N, A-80:L	Moderate +	11% reduction in AUMs and grazing system would provide a moderate increase in deer and antelope forage and reduce competition to slight.
124P Pinon Hills	81:L, A-80:I	Moderate +	27% reduction in AUMs and grazing wystem would provide a moderate increase in deer and antelope forage and reduce competition. Some competition could remain in the grazed pastures each year. Development of one new water source would especially benefit deer and antelope.
125P Rio Grande Common	81:L, A-80:I	High +	12% reduction of AUMs, change of class from mixed sheep and cattle to mostly cattle, and consolidation of nearly yearlong grazing season to fall-winter would provide a moderate increase in deer and antelope forage and reduce competition to slight. Six new water sources would also be especially beneficial to deer and antelope. Fair riparian habitat along the Rio Grande would improve somewhat, but could remain overused by livestock.
126P La Sauses	81:N, A-80:L	Moderate +	9% reduction in AUMs and grazing system would provide a moderate increase in antelope forage and reduce competition to slight. Four new water sources would be especially beneficial to antelope as would modification of 3 miles of woven wire fence with antelope passes. Repair of the boundary fence along 2 miles of the Rio Grande would improve riparian habitat from fair to excellent.
127Eg Saddleback Mountain	81:N, A-80:N	High +	Elimination of 32 AUMs would effectively reserve all vegetation for wildlife forage and cover.
129P Rio Grande	82:N, A-78:L	Low +	Grazing system would provide a slight increase in antelope forage. Competition would remain slight. Increased plant vigor and density would improve nesting cover for waterfowl from the adjacent Alamosa National Wildlife Refuge.
132P Four Mile	82:N, A-78:N	Low +	Grazing system would produce a low improvement in range condition from good to excellent.
133P Tobin Creek	82:I, A-78:I	Low +	Grazing system would provide a low increase in deer, elk, and antelope forage; but moderate competition could remain due to fall and winter horse use.
134P Foothills	82:C, A-78:C	Moderate +	Elimination of early spring and late fall grazing and grazing system would provide a slight increase in forage for deer, elk, and antelope, and reduce competition to slight. Five new water sources would be especially beneficial to antelope and deer.
137P Blanca WHA	82:N, A-78:N	Moderate +	Grazing system would provide an uncertain improvement in the quality of waterfowl habitat area under development. Flexibility in the AMP would provide for total elimination of grazing if habitat does not improve.

TABLE III-6. IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON TERRESTRIAL WILDLIFE OF THE SAN LUIS RESOURCE AREA (cont.)

Allotment Number and Name	Big Game Management Units Impacted*	Impacts of Proposed Grazing Management	
		On Wildlife Habitat	Description
138P Dry Lakes	82:N, A-78:N	Moderate +	Grazing system would produce a moderate improvement in range condition.
140Eg Park Pasture	82:I, A-78:N	Low +	Elimination of 12 AUMs would reserve all vegetation for wildlife forage and cover.
141P Zapata Falls	82:C, A-78:I	Low +	13% reduction in AUMs would provide a low increase in forage for deer, elk, and antelope; but water developments could encourage grazing in areas not presently grazed and create moderate competition between deer and cattle. One mile of riparian habitat would remain in good to excellent condition.
159E Klondyke	68:I, A-73:L	Low +	Continuation of existing AMP would provide a slight increase in deer and elk forage. Riparian habitat along Tuttle Creek would remain in excellent condition, and competition would remain slight.

Wildlife in General

The proposed range improvements are listed for each allotment in Chapter I (pp. I-5 f.), and their individual and cumulative impacts on vegetation are listed in the preceding section of this chapter (pp. III-18 f.). Each type of range improvement would have the same general impact on wildlife wherever it would be implemented in the resource area. The following general effects on wildlife habitat would result from long-term use of the proposed range improvements. The impacts on wildlife which would result from this changed habitat are described under the type of wildlife concerned and summarized at the end of this section.

A total of 104 acres of vegetation, which provides food and cover for wildlife, would be lost during the long-term use of the proposed range improvements. This loss of habitat is considered insignificant when compared to the total amount of habitat available.

Water developed at wells, springs, and catchments would be delivered to troughs by enclosed pipelines and, therefore, would not be considered available to wildlife except at the troughs. However, water developed at catchments is considered more available to wildlife because other available sources are not generally nearby. The storage tanks proposed would make marginal water sources more reliable for wildlife.

A total of 258 new water sources (212 troughs and 46 reservoirs) would be provided for all wildlife by the proposed livestock watering developments. These new water sources would probably not expand the total range of any wildlife species, but the distribution of usable habitat during the hot and dry months would be improved, and the overall diversity of wildlife habitat would be increased.

Developing springs and fencing the spring sites would improve the value of the sites as wildlife habitat by reserving the wet-meadow vegetation exclusively for wildlife. Development of springs could collect all the available surface water and dry up existing sources of water for wildlife and destroy existing wet-meadow vegetation.

Construction of reservoirs would create overused and trampled vegetation around the waterline. The vegetation in this habitat would also be lost to all terrestrial wildlife for the life of the reservoirs.

Big Game

Herbivorous big-game animals such as mule deer, elk, pronghorn antelope, and bighorn sheep, would be directly impacted by the proposed action. The primary impacts on these large herbivores would relate to changes in the amount of forage available for each, the degree of competition which would remain between the individual big-game species and the livestock use which is proposed, plus any new water sources that would be provided. The changes in the amount of forage available to these large herbivores resulting from the proposed grazing management systems are rated relatively for each allotment in table III-6 (p. III-50 f.).

The projected cumulative impacts of the proposed grazing management systems on big-game herds are presented in table III-7 (p. III-62) by big-game management unit. The projected percentage change in big-game forage available is an estimate based on present range conditions and competition levels and the relative improvement expected to occur if the AMPs were implemented. The projected change in big-game populations is the net change expected with increases in available forage and other factors not related to the proposed action, such as loss of habitat to subdivisions and recreational uses.

Implementation of the proposed AMPs would result in a long-term net population gain of about 220 mule deer, 130 elk, 205 pronghorn antelope, and 50 bighorn sheep in the San Luis Resource Area.

Mule deer and elk forage would be expected to increase by about 20 percent each as a result of implementing the proposed AMPs, but the net population gain would probably not exceed 5 percent. Factors unrelated to the proposed action, such as subdivisions and other conflicting human uses, would eliminate a significant proportion of the habitat available now, especially on private land. The remaining habitat would have to be improved to replace these losses, in addition to creating forage reserves and improving the condition of all habitat to "good" or better.

Antelope forage would be expected to increase by about 25 percent throughout the resource area as a result of the proposed AMPs. This increase would result in a net population gain of about 18 percent. Antelope would gain proportionately more than deer and elk. Higher competition levels presently exist between antelope and livestock than

TABLE III-7 CUMULATIVE IMPACTS OF THE PROPOSED GRAZING MANAGEMENT SYSTEMS ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA

Game Management Unit*	Species	Projected Change NRL Forage	Projected Population, NRL		
			Population Change		
			%	No.	Population After Change
68	Deer	+ 20%	+ 5%	62	1,312
79	Deer	+ 10%	+ 5%	18	368
80	Deer	+ 20%	+ 5%	40	840
81	Deer	+ 30%	+ 5%	30	630
82	Deer	+ 10%	+ 5%	72	1,515
Total	Deer	+ 20%	+ 5%	222	4,725
68	Elk	+ 20%	+ 5%	38	788
79	Elk	+ 10%	+ 5%	15	315
80	Elk	+ 20%	+ 5%	32	682
81	Elk	+ 30%	+ 5%	30	630
82	Elk	+ 10%	+ 5%	15	315
Total	Elk	+ 20%	+ 5%	130	2,730
A-73	Antelope	+ 25%	+ 20%	40	240
A-74	Antelope	+ 20%	+ 15%	45	345
A-76	Antelope	+ 40%	+ 30%	33	143
A-77	Antelope	+ 25%	+ 15%	22	172
A-78	Antelope	+ 25%	+ 15%	16	126
A-79	Antelope	+ 25%	+ 15%	26	201
A-80	Antelope	+ 35%	+ 25%	25	125
Total	Antelope	+ 25%	+ 18%	207	1,352
S-10 Total	Bighorn Sheep	+ 30%	+ 20%	50	300

*Game Management Unit Locations are shown on Figures II-17 (deer and elk), II-21 (antelope), and II-24 (bighorn sheep).

between livestock and deer and elk, and range conditions are generally poorer in the antelope range.

Forage for the Trickle Mountain Bighorn Sheep herd would be expected to increase by about 30 percent from the AMPs proposed for that area, resulting in a net population gain of about 20 percent. This herd is being maintained at its present level because the herd is near the carrying capacity of the range. A 30-percent increase in forage would be adequate to allow a 20-percent increase in the herd, and the remainder would be reflected in improved range condition and forage reserves.

It is assumed that competition could never be totally eliminated when rangelands are used by both domestic livestock and herbivorous big game because of direct overlaps in food preference. Grazing use by both groups could therefore be considered compatible under a policy of multiple use, when competition is reduced to that slight level at which grazing by one group would not significantly affect the amount of forage available to the other. The degree of competition expected to occur between livestock and herbivorous big-game animals as a result of the proposed grazing management systems is rated for each allotment in table III-6 (pp. III-50 f.).

Significant changes in the amount of forage available for herbivorous big-game animals and the relative level of competition between these animals and livestock would occur as a result of several distinct types of action. These include significant reductions in livestock stocking rates, changes in class of livestock (sheep, cattle, horses), changes in season of use, and changes resulting directly from the type of grazing system proposed for each allotment management plan. Table III-6 (pp. III-50 f.) lists those allotments for which these actions are proposed. Table III-7 (p. III-62) lists the projected changes in forage that would result from the projected population changes.

Reductions in Livestock Stocking Rates. Significant reductions in livestock stocking rates as part of the proposed AMPs would generally reduce livestock and big-game competition and increase forage for big-game animals. This action would have significant impact only in those allotments where serious competition exists and/or the range is in poor condition. Large reductions would generally be of little benefit to big game or wildlife in allotments that are in good condition, in allotments where serious competition does not exist, or in allotments that are not important wildlife habitat. Table III-6 (pp. III-50 f.) lists those allotments for which significant reductions have been proposed. Reductions of 20 percent (in AUMs) are proposed in fifteen AMPs.

However, total elimination of grazing is often not the answer for optimum wildlife production. Anderson and Scherzinger (1975) discuss a prime elk winter range in Oregon on which cattle grazing was used as a tool to dramatically increase elk forage. Average elk counts increased from 120, when the area was grazed without an intensive livestock management plan, to 320, when livestock grazing was eliminated, and to 1,200 after several years under a management system designed to improve the succulence and nutritive value of winter elk forage. The range condition also improved noticeably during this period, and AUMs of cattle grazing were increased by 2.6 times.

Changes in Class of Livestock. Changes in the class of livestock grazed could have significant impacts on the amount of big-game forage available and the level of competition between big game and livestock. Changes from sheep to cattle would generally benefit deer and antelope because of the overlaps in their preferences for forage. Yoakum (1972) states that sheep can be serious competitors of antelope, especially on overused range, but that there is little competition between cattle and antelope because cattle tend to utilize grasses and antelope consume mainly forbs and browse. McKean and Bartmann (1972) found that sheep made excessive use of key mule deer browse species at heavy stocking rates. However, McKean and Bartmann (1972) also concluded that both sheep and cattle would seriously compete with mule deer for key browse forage at heavy stocking rates but that neither would compete at moderate stocking rates. Table III-6 (III-50 f.) lists the six allotments for which changes in class of livestock are proposed.

Changes in Season of Use. Changes in season of use could also have significant impacts on big-game animals, but less so than reductions in stocking rate or changes in class of livestock. Hansen and Reid (1975) found the greatest dietary overlap between cattle and deer and elk to be in the late summer-early fall period, but the study did not consider winter grazing. Cattle and sheep both have the greatest dietary overlap with deer, elk, and antelope during the winter months because of the tendency of most animals to seek the higher protein available in browse during this period of stress.

However, big-game animals would derive the greatest benefit by achieving a proper stocking rate throughout the resource area; McKean and Bartmann (1972) concluded that "cattle, sheep, and mule deer can be grazed singly or in combination if kept at moderate (stocking) rates, as described for each animal, without serious competition and accompanying range regression."

Significant changes in season of use were proposed in thirteen AMPs. Refer to table III-6 (pp. III-50 f.) for the specific allotments concerned.

Grazing Systems. Impacts resulting from the grazing systems would be significant to herbivorous big-game animals in some cases. Rest rotation grazing systems are usually designed to heavily utilize the forage in at least one pasture each year in order to rest one pasture. Livestock of any class are forced to heavily utilize forage of all types in the heavy-use pasture no matter what the season of use is, and this results in little big-game forage in that pasture. This impact would be most severe in those AMPs where the proposed grazing system is a winter season rest rotation system for sheep. Sheep have been documented to be the greatest competitors with deer and antelope for forage, and forced heavy winter sheep grazing in some pastures of a system would worsen the situation (see the discussion above about changes in season of use and class of livestock). However, all forage in rested pastures and all regrowth in (summer) early-use pastures would be reserved exclusively for wildlife forage and cover. The eventual improvement in range condition as expressed in plant vigor and ground cover would also benefit big-game animals, directly in the form of forage and cover and indirectly as a general improvement in the ecological condition of their habitat.

The proposed grazing systems could also have an adverse impact on big game, especially deer and antelope, by tending to shift the vegetative composition from browse (preferred deer and antelope forage) to grass. Many of the proposed AMPs have based the rotation date on the important physiological growth stages of one to two key grass species, and this practice would tend to favor those grasses at the expense of forbs or browse. This change is not expected to reach the level at which big-game populations would be affected. Rather, it would more likely amount to a less than 10 percent change in vegetative composition from browse and forbs to grass. This change in forage availability has been considered in the overall population change projection in table III-7 (p.III-62).

Long-term utilization of the proposed fences and associated structures such as gates, cattleguards, and water gaps would create minor problems for big-game animals throughout the resource area. All fences impede the natural movements of deer, elk, antelope, and bighorn sheep to a degree, and injury or death could occur if they become entangled in fence wire. Entanglement often occurs when animals are weak due to stresses such as winter starvation and are unable to jump high enough. Woven-wire fences used to control domestic sheep totally prevent the passage of antelope since antelope normally crawl under a fence rather than jump it.

These impacts would be minimized but not eliminated by applying BLM fencing standards when constructing new fences and modifying existing ones on big-game ranges. A total of about 280 miles of new and repaired fence is proposed, and an estimated average of five big-game animals would die annually as a result of entanglements in these fences.

Modification of existing woven-wire fences with antelope passes would eliminate impediments to antelope movements and effectively expand their range into the allotments concerned. These modifications would occur in the following allotments, which total 41,000 acres:

15P	Nye	123P	Eight Mile
100E	Ciscom Flat	125P	Rio Grande Common
115P	Alta Lake	126P	La Sauses
121E	Kiowa Hill		

The use of antelope-pass fence modifications would also benefit future antelope introduction to Nicomodes, Limekiln, and Pup Peak allotments. This expanded range was considered in the figuring of the projected antelope population in table III-7 (p. III-62).

Waterfowl

Waterfowl would be directly benefitted in varying degrees by the implementing of many of the proposed grazing management systems. Waterfowl production would increase in those allotments in which permanent stockponds exist or are proposed and rest rotation systems would be used. Gjersing (1975) found (1) that duck production increased in pastures under rest rotation grazing and (2) that pair populations generally increased in pastures grazed in spring or early summer or rested the previous year, but that such populations decreased in pastures grazed in the late summer or fall of the previous year. The increases are apparently related to the residual nesting cover from the previous year.

Those allotments for which reservoirs are proposed are listed in Chapter I (Table I-2, p. I-5 f.). Based on the performance of existing reservoirs, no more than 10 of the 46 proposed reservoirs would have permanent water which would attract nesting waterfowl. The remainder would probably provide seasonal livestock water, but no emergent vegetation would exist. The 10 new permanent ponds would be expected to attract a maximum of 10 breeding pairs and produce a maximum of 5 broods or 25 fledgling ducks annually. The potential for waterfowl production is greater than this, but overgrazing and trampling by livestock on the shorelines would reduce it to this level.

The grazing system proposed for the Blanca Wildlife Habitat Management Area is designed to periodically renew the vigor of nesting cover by removing old growth and stimulating new growth. This technique would be only one of the many being utilized to improve nesting cover in this area. It is not possible to project increases in production specifically to the grazing system.

This proposed grazing system could also turn out to be detrimental to optimum waterfowl production by removing excess vegetation which could be used for nesting cover, but no long-term impacts would result. Flexibility in the proposed system allows for total elimination of grazing if wildlife objectives are not met.

Other Terrestrial Wildlife

Most other forms of terrestrial wildlife would also generally benefit from the proposed grazing management systems. The primary benefit to all species would be the general improvement in vegetation which provides food and cover for wildlife throughout the resource area. Impacts of the proposed AMPs on vegetative condition are evaluated in table III-5 (pp. III-22 f.) as changes in present ground cover and percent species composition of desired range forage plants (mostly cool season species) for each proposed AMP. The overall distribution and diversity of wildlife populations would improve with this improved vegetative condition and the 256 proposed new water sources.

The overall species composition and population densities of other terrestrial wildlife forms would not be expected to change significantly as a result of the proposed AMPs. However, the distribution of individual species would increase, especially for those species requiring free water in the summer. The allotments with proposed new water sources are identified in the proposed action (table I-2, pp. I-5 f.).

The expected improvement in nongame wildlife distribution would increase the opportunity for wildlife viewing proportionately. Insignificant increases in small-game populations would also be expected.

Forage would increase for herbivorous small mammals, such as lagomorphs and rodents, and cover would increase for all small mammals. An increase in food supplies for granivorous (seed-eating) birds would also result with improved vegetative condition. Cover would increase for all birds which use ground vegetation for nesting, feeding, or escape because of increased plant vigor and density. Minor changes in plant composition from browse to grass would benefit ground nesting birds by increasing nesting cover, but shrub nesting birds would lose a proportionate amount of cover. Thus, a minor shift in species composition of the avifauna from grassland birds to shrubland birds would occur, but no significant impacts are expected.

Secondary consumers such as birds of prey, large mammalian predators, and reptiles would benefit indirectly. Increases in plant vigor and density would allow increases in populations of the herbivores or primary consumers which comprise their prey, but no measurable increases in predator populations would be expected.

Terrestrial wildlife species which prefer riparian woodland habitat would also benefit from the proposed grazing management systems. These species are mostly nongame birds, such as the yellow warbler, common flicker, northern oriole, and nongame mammals, such as the raccoon and meadow vole.

Benefits to these animals would occur on at least 6.8 miles of riparian woodland created or improved due to relief from overgrazing. Overuse would remain on some riparian woodlands as a result of the proposed grazing management systems, but all woodlands would improve in condition somewhat, and many would improve to good or excellent condition. Table III-8 (pp. III-77 f.) in a subsequent section in this chapter on aquatic and riparian communities identifies the allotments and the amount of riparian habitat concerned.

Long-term use of the proposed range improvement projects would have the following effects on terrestrial wildlife. Operation of pumpwell motors could disturb wildlife, but animals would most likely become accustomed to the sound. Windmills would benefit birds-of-prey by providing resting and hunting perches. Fences and boundary markers would provide hunting perches for raptors in some short-grass and half-shrub areas which might have a shortage of such perches. Long-term use of fenced catchment sites would also provide roosts for birds, especially raptors, which could be attracted by a congregation of small mammal prey within the fenced sites.

Small birds and mammals could drown in the proposed watering troughs when attempting to drink even though floating ladders in each trough are designed to provide drinking perches and a means of escape. Seep areas created by the overflow pipe from each trough would also create excellent watering places for small animals. Trampling by livestock would continue to destroy vegetation, which had provided food and cover for wildlife, in the immediate vicinity of the trough during the life of the project.

Long-term use of reservoirs would destroy the inundated habitat for the life of the project. Livestock overgrazing and trampling on the shoreline of reservoirs would also make these areas of little value for wildlife food and cover. Reservoirs would provide 46 new water sources for wildlife.

Endangered Species

The general improvement in range condition would directly benefit prairie dogs by providing them with more forage. This would indirectly benefit any black-footed ferrets which might be present. This potential impact on the endangered black-footed ferret has been specifically identified in table III-6 (p. III-50 f.) for the eleven allotments in the Los Mogotes and Punche Valley vicinities where the probability of finding ferrets is high.

Permanent displacement of prairie dogs by reservoirs could be a long-term impact on any black-footed ferrets which might be present, causing them to seek new areas for food and cover. Reservoirs could also attract waterfowl and other birds, which would improve hunting conditions for peregrine falcons if any were in the vicinity. No impacts are anticipated on the whooping cranes which visit the resource area.

The actual construction of the range improvements would cause a minor short-term disturbance to all wildlife. This disturbance would be minor in all cases and insignificant in most, since it would last only as long as people and machinery were at the project site.

Construction of the proposed range improvements would cause a short-term loss of 485 acres of vegetation which provides food and cover to wildlife (see table I-10, p. I-79). All mobile animals would be displaced temporarily, and immobile animals would be destroyed. Small mammal dens, feeding areas, and the like would also be destroyed within the 485 acres that would be disturbed. Storage of water in the proposed reservoirs would also destroy immobile animals.

The short-term impact of the proposed AMPs is thus considered insignificant to the wildlife populations of the resource area.

Summary

Implementation of the proposed action would result in a net long-term population gain of about 222 mule deer, 130 elk, 207 pronghorn antelope, and 50 bighorn sheep in the San Luis Resource Area. These increases would result in increased hunting opportunity and economic gain.

Construction of about 280 miles of new and repaired fence would impede the natural movements of big-game animals and cause about five big-game animals to die annually from entanglement.

Construction of reservoirs would create ten new permanent ponds which would increase waterfowl production by about five broods annually.

The species composition and population densities of other terrestrial wildlife would not change significantly as a result of the proposed action, but the distribution of individual species would increase, especially around the 256 new sources of water.

No definite significant impacts on endangered species were identified.

Aquatic and Riparian Communities

The condition of riparian vegetation has a dominant role in determining the condition of aquatic and riparian communities. Generally, riparian vegetation begins growth earlier in the spring and continues growth later into the fall than most upland range plants. During this time, the plants are more palatable than dried range plants and are actively sought by cattle (Platts and Rountree 1972).

Aquatic and Riparian Vegetation

Two studies--one by Platts and Rountree (1972), the other by Eckert (1975)--question whether or not grazing management can restore riparian vegetation, especially woody plants, on an overgrazed pasture. In woody plants (riparian and upland), food reserves and growing points, which are located on twigs and stems, are exposed. Therefore, grazing these plants after their reserves are stored and during their dormant period could still harm them (Hormay 1970).

Too little information is presently available to determine the impacts of the short-term, high-intensity grazing of the proposed action on stream-side vegetation. The final outcome of the proposed grazing management plans on the overall riparian and aquatic communities is unknown. However, the present declining trends would be expected to stabilize in most of the management units (see table III-8, p. III-76), but little overall improvement of the riparian vegetation would be anticipated.

TABLE III-8. IMPACTS OF THE PROPOSED GRAZING SYSTEMS ON RIPARIAN VEGETATION IN THE SAN LUIS VALLEY

Management Unit	Stream Name	NRL Stream Miles	Cause of Impacts	Short-Term Impacts on Riparian Vegetation	Long-Term Impacts on Riparian Vegetation*
2E Arizona-Colorado (Poncha Pass East	Fisher Creek	0.5	No change in grazing pattern. Partial rest. Increased grazing during grazing period. Rest periods would reduce pressure.	No change	Rating would be improved from "poor" to "fair."
	Upper San Luis Creek	0.6	No change in grazing pattern. Increased grazing pressure on stream bottoms during grazing period. Rest periods would reduce pressure.	No Change	Overall condition of riparian habitat would decrease slightly. Rating of "good" would be retained.
	Lower San Luis Creek	0.4	No change in grazing pattern.	No change	Rating of "poor" would be retained.
	Dorsey Creek	0.5	Large woody plants would limit livestock access to stream side.	No change	Rating of "good" would be retained.
	Lone Tree Creek	0.4	**	**	**
(East Side)	Swidinski Creek	0.5	**	**	**
	Jack Gulch	1.5	**	**	**
	Carr Gulch	2.0	**	**	**
7P Alder	Spring Creek	0.3	**	**	**
	Alder Creek	0.4	No change in grazing pattern.	No change	Rating of "good" would be retained.
9E Turquoise Gulch	Turquoise Gulch	1.8	**	**	**
11P Kerber Creek	Little Kerber Creek	0.2	**	**	**
25E Valley View Hot Springs	Lower Garner Creek	1.7	No change in grazing pattern.	"Improving" condition of woody herbaceous riparian vegetation would continue.	"Fair" rating would improve to "good."

* Rating categories ("poor," "fair," "good," "excellent," etc.) are described in table II-33.

** No information is available on present riparian condition.

TABLE III-8. IMPACTS OF THE PROPOSED GRAZING SYSTEMS ON RIPARIAN VEGETATION IN THE SAN LUIS VALLEY (cont.)

Management Unit	Stream Name	NRL Stream Miles	Cause of Impacts	Short-Term Impacts on Riparian Vegetation	Long-Term Impacts on Riparian Vegetation*
26Eg Garner Creek	Middle Garner Creek	0.3	Eliminate grazing.	No change, area now well protected.	"Excellent" rating would be retained.
28P Cotton Creek	Cotton Creek	0.8	Increased grazing pressure on stream bottoms during grazing periods.	Reduction of some woody riparian vegetation would occur.	"Good" rating would be retained.
29C Rito Alto	Rito Alto Creek	0.2	**	**	**
42P Poison Gulch	Lower Ford Creek	1.5	Rest rotation would give riparian vegetation more rest than it presently receives. Increased pressure during grazing cycle.	Growth of riparian herbaceous vegetation would increase. Some woody plants could also develop.	"Poor" rating would be increased to "fair."
	Middle Ford Creek	0.5	Rest rotation would give riparian vegetation more rest than it presently receives. Increased pressure during grazing cycle.	Woody and herbaceous vegetation would increase in growth.	"Good" rating would be retained.
	Baxter Creek	1.5	No permanent water to attract livestock.	Rest rotation system would increase herbaceous vegetation.	"Fair" rating would be retained.
	Lower Tuttle Creek	0.5	Increased grazing pressure and longer rest periods. Some protection provided by existing woody vegetation.	Slight reduction of woody vegetation would occur.	"Excellent" rating would decline to "good."
	Spring Gulch	0.6	**	**	**
	Horse Canyon	0.8	**	**	**
45P Cross Creek	Cross Creek	0.5	Heavier grazing and longer rest periods from rest rotation system.	Some reduction of woody vegetation would occur. Riparian herbaceous species would increase.	"Good" rating would be retained.

TABLE III-8. IMPACTS OF THE PROPOSED GRAZING SYSTEMS ON RIPARIAN VEGETATION IN THE SAN LUIS VALLEY (cont.)

Management Unit	Stream Name	NRL Stream Miles	Cause of Impacts	Short-Term Impacts on Riparian Vegetation	Long-Term Impacts on Riparian Vegetation*
46P Trickle Mountain	Lower Sheep Creek	0.3	Area protected by existing fence.	No change	"Good" rating would be retained.
47P Sheep Creek	Upper Sheep Creek	1.7	No change in present grazing pattern.	No change	"Excellent" rating would be retained.
51E Saguache Park	Fourmile Creek	0.8	**	**	**
52P Hat Springs	Hat Springs Creek	1.8	Reduce much of the stream and seep flow via spring development.	Existing herbaceous and scanty woody vegetation would be reduced.	"Fair" rating would be reduced to "poor."
	Spring Gulch	0.4	**	**	**
53P Robb Ranch	Saguache Creek	0.5	**	**	**
54C Mead	Houselog Creek	0.5	**	**	**
84P Rock Creek	Rock Creek	0.5	**	**	**
85P McMahon	Alamosa River	1.7	Heavier grazing and longer rest periods would alter existing riparian vegetation.	Easy access points would be heavily grazed. Other areas would show increased vegetative growth.	"Good" rating would be retained.
	Cat Creek	0.5	**	**	**
102P La Jara Creek	La Jara Creek	2.5	Heavier grazing and longer rest periods would alter existing riparian vegetation.	Some increase in woody and herbaceous vegetation would occur.	"Good" rating would be retained.
107P Grande	Fox Creek	1.0	**	**	**
117P River	Rio Grande	3.0	Livestock would not have access to canyon areas.	No change	"Good" rating would be retained.

TABLE III-8. IMPACTS OF THE PROPOSED GRAZING SYSTEMS ON RIPARIAN VEGETATION IN THE SAN LUIS VALLEY (cont.)

Management Unit	Stream Name	NRL Stream Miles	Cause of Impacts	Short-Term Impacts on Riparian Vegetation	Long-Term Impacts on Riparian Vegetation*
118Eg Mondragon Individual	Rio Grande	1.0	Livestock would be removed from range.	No change. Livestock are presently excluded from canyon area.	"Good" rating would be retained.
119P South Valley	Rio Grande	1.0	Livestock would not have access to canyon area.	No change	"Good" rating would be retained.
124P Pinon Hills	Rio Grande	0.5	Livestock would continue to cross river from private land and could not be fenced out.	Reduction of existing herbaceous and scanty woody vegetation would occur.	Continued decline is expected "poor" rating would be retained.
125P Rio Grande Common	Rio Grande	4.5	Livestock would continue to cross river from private land and could not be fenced out.	Reduction of existing herbaceous and scanty woody vegetation would occur.	Continued decline is expected, "poor" rating would be retained.
126P La Sauses	Rio Grande	2.0	Livestock would continue to cross river from private land and could not be fenced out.	Reduction of existing herbaceous and scanty woody vegetation would occur.	Continued decline is expected, "poor" rating would be retained.
147C Section 15 Lease	Short Creek	0.2	**	**	**
159E Klondyke	Upper Ford Creek	1.0	No change in grazing pattern.	No change	"Poor" rating would increase to "good."
	Upper Tuttle Creek	1.5	No change in grazing pattern. (Fallen trees blocking livestock access.)	No change	"Poor" rating would increase to "good."
162C Hellgate	Carnero Creek	0.3	**	**	**
164U Terrace Lakes	Alamosa River	0.3	Unallotted	No change	"Good" rating would be retained.
165U Bonanza	Kerber Creek	0.5	Unallotted	No change	"Nonexistent" rating would be retained.
	Elkhorn Gulch	0.3	**	**	**

Herbaceous riparian plants (sedges, rushes, and grasses) would be expected to react to grazing management in the same favorable way as upland herbaceous plants react (see table III-5, pp. III-22 f.). However, without woody riparian vegetation, a riparian community of herbaceous vegetation would be classified as being in poor condition (see table II-32, pp. II-138).

Small openings, less than 20-feet wide, existing in the vegetation along streams would be enlarged in those pastures where livestock are concentrated. Such concentration of livestock would destroy the riparian vegetation through trampling and heavy grazing.

Debris collection during flood periods on 0.1 mile of fence which crosses three streams would cause lateral erosion of the stream channel, which would in turn destroy small amounts of riparian and aquatic vegetation. Approximately two acres of riparian vegetation would be temporarily removed from production when less than one mile of pipeline was constructed through riparian vegetation from streams.

During spring development, five acres or less of riparian and aquatic vegetation located on the construction sites would be destroyed. Of the 27 springs proposed for development, some would be expected to have the surface flows eliminated, thus destroying the aquatic and riparian communities since revegetation with riparian and aquatic plants would not be expected. The number of springs affected, however, cannot be predicted prior to development.

The development of reservoirs and check dams and the placement of bentonite in existing reservoirs would result in approximately 23 acres of permanent surface water. Approximately 20 acres of riparian and aquatic vegetation would evolve.

Livestock trampling would also do damage to the streambed substrate and stream banks which would increase the movement of soil into the stream--damage that could not be quantified. As a result of the soil movement into the stream, an immeasurable amount of invertebrates and fish and amphibian eggs would be smothered. Furthermore, an unknown decline would be expected in aerobic organisms due to the deoxygenation of pools in small streams as a result of the biologic oxygen demand of livestock feces in such streams.

An unknown amount of invertebrates and fish and amphibian eggs would be destroyed by the silt deposited from construction and maintenance of fences and other range improvements (pipelines, storage tanks, reservoirs, check dams, and water troughs). (See table III-3, p. III-6, for estimates of soil losses from project construction.) Aquatic organisms (invertebrates) would be displaced at the point of water collection where pipelines originate from Sheep Creek, Cotton Creek, Steel Canyon, Alder Creek, and Spring Creek. The removal of water would not decrease the stream flow therefore would have no impact on aquatic and riparian communities.

Water troughs would provide 212 additional water sources for invertebrates, amphibians, birds, and mammals, thus widening their distribution on NRL. The overflow from 31 troughs would create small areas, totaling less than 20 acres, of riparian and aquatic communities.

Unknown numbers and species of invertebrates and amphibians associated with wet seeps or undeveloped springs would be destroyed during spring development. Again, surface flows of 27 springs might be eliminated, destroying the aquatic and riparian communities since riparian and aquatic plants would not survive. The number of springs affected, however, cannot be predicted prior to development.

The 20 acres of riparian and aquatic vegetation which would evolve around reservoirs and dams would provide habitat to aquatic and riparian wildlife.

Summary

Implementation of the proposed action over the long term (by 2005) would result in a net improvement of riparian vegetation on 4.9 miles of stream, an increase of 23 acres of permanent surface water, an increase of 40 acres of riparian vegetation, and 212 additional drinking water sources. An unknown short-term loss of invertebrates and fish and amphibian eggs would be destroyed by siltation resulting from construction. Woody riparian vegetation would remain stable or decline.

Land Use

Recreation

The effects of the proposed grazing management upon recreation would vary according to the recreation activity involved. There are no anticipated impacts on four-wheel drive, motorcycle, or hiking use on NRL. Nor are there any impacts anticipated for sledding, snowmobiling, or collecting pinyon nuts.

The only impact expected to affect driving for pleasure is a small improvement of the scenic qualities of NRL when viewed from a county road or other major thoroughfares. A general increase in plant vigor would give NRL a "healthier" appearance.

Hunting demand has already exceeded big-game supply in the San Luis Valley for antelope and bighorn sheep and partially exceeded the supply for deer and elk. The demand for deer and elk hunting is expected to fully exceed the supply by 1980.

As stated in the wildlife section of this chapter, the proposed action should result in 50 more bighorn sheep, 207 more pronghorn antelope, 222 more deer, and 130 more elk. These increases in herd size should ultimately allow more hunting permits to be issued (deer and elk hunting would probably be by drawn permit only by 1980). Although the exact number would vary according to Colorado Division of Wildlife policy, approximately 120 additional big-game permits would be allowed.

This may generate as much as 1,325 additional hunter days of use. Most of this additional use would occur on national forest lands.

The "quality" of fishing may be increased by implementation of the proposed action. Cattle would still use the streams as a source of water; however, the level of use would be lowered through distribution of cattle into virtually unused areas, impacting the fishing streams with less trampling and feces than at present. Although fishing conditions may be more pleasant as a result, it is doubtful that fishing would increase after implementation of the proposed grazing systems.

Four-wheel drive and motorcycle users would have more primitive roads and trails (150 miles estimated) available to them as a result of project construction and maintenance activities.

The proposed fences would have no significant impact on those who drive for pleasure as a recreation activity. The fencing would, however, impact hiking, pinyon-nut collecting, and hunting use occurring on NRL. Fences would be an obstacle to be climbed or traveled around until a corner gate or road gate could be reached. The impact of fences on these activities would be that of an annoyance rather than a barrier. No significant reduction in these dispersed activities is expected from fence construction.

Off-road vehicle users would find the proposed fences to be an impassable barrier. The proposed corner gates and road gates would reduce this impact, and impacts are generally expected to be low.* Use level is presently believed to be low* and is not anticipated to significantly increase in the future. Also, the majority of the NRL in the San Luis Valley are already bounded and traversed by many fences.

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*No data are available for a more accurate estimation

Four-wheel drive and motorcycle users would have a few more gates to open and cattleguards to cross in their favored use areas; however, this impact is also expected to be low.*

A fence can be a dangerous barrier to a sledder or snowmobiler if the snow is not deep enough to bury it. The impacts anticipated from fence construction, however, are expected to be low* since, as described in Chapter II, snowmobiling in the Ra Jadero area is restricted to existing roads providing access to national forest lands and use of NRL near Poncha Pass is low.* The allotments involved near Poncha Pass are Poncha Pass West and Alder. No impacts would occur on the Triangle Allotment on Chiquita Peak.

The additional watering troughs, earthen reservoirs, and erosion control structures would attract big game, thus providing additional concentration areas where hunters could find the big game.

Agriculture

Full implementation of the proposed grazing management would have little impact on the non-grazing sector of the agricultural industry in the San Luis Valley. The proposed action is expected to result in an overall increase in forage production of nearly 19,000 AUMs. Some of this increase could be licensed for use by domestic livestock, but BLM is not committed to do this. In order to increase livestock use, additional numbers of livestock would be run or the original numbers of livestock would be left to graze the additional forage for a longer period of time.

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*No data are available for a more accurate estimation.

Since water for irrigation is the primary limiting factor in the San Luis Valley and irrigation water in this area is presently over obligated, it is doubtful that any suitable and additional lands would be put into crop production. Nor would it seem likely that an increase in forage production and proportionate increase in stocking livestock would place a heavier demand upon crop production necessary to provide supplemental feed. Likewise, it would appear that existing non-grazing agriculture could presently meet any slight increase in supplemental feed demand. This ability to make necessary adjustments in crop production has been adequately demonstrated in the past by such conditions as drought, commodity price, market demands, and other factors which keep the agricultural industry in a constant state of minor flux. As noted in Chapter II, almost 60 percent of all cropland in the San Luis Valley is devoted to alfalfa and native hay production.

In the absence of any large-scale change in livestock numbers resulting from implementation of the proposed action, no environmental impacts are expected to occur to the non-grazing agricultural sector.

Livestock Grazing

Upon implementation of the proposed action, grazing use on NRL would not exceed 34,626 AUMs annually, which is a decrease of 373 AUMs from present use. Reductions in active qualifications due to unsuitable range or suspended non-use total 2,450 AUMs annually. This reduction in qualifications does represent a decrease in use levels and has socio-economic implications discussed in a subsequent section of this chapter. This decrease represents a reduction of about 7 percent in AUMs from the combined average annual proposed use and qualifications lost (2,450 + 34,626 = 37,076; 2,450 divided by 37,076 = 6.61 percent).

Present use, as shown in table III-9, is based primarily on existing licensed use, recognizing that some operators use less than that amount in some years. While current actual use is not exactly known, it has been estimated that grazing on NRL in the San Luis Valley has dropped to as low as approximately 30,000 AUMs in some years (reflecting drought conditions and resultant non-use).

The proposed grazing action represents an increase over actual annual use ranging as high as 4,000 AUMs annually, an increase of about 13 percent. The average actual annual increase would probably be in the area of 2,000 AUMs for an increase of about 6 percent.

Annual actual use studies or surveys in addition to a review of annual licensing levels over a period of years would be required to obtain statistically reliable data. The lack of historical actual use data precludes the possibility of establishing a time-series trend line

TABLE III-9. LIVESTOCK GRAZING ANALYSIS

Allotment Number and Name a/		Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availability d/ in 2005	Potential Productivity e/ AUMs
1P	Poncha Pass West	555	375	500	1,603
2E	Poncha Pass East (and)	380	380	)	
	East Side	1,875	1,875	) 3,000	7,003
3C	Round Hill	10	10	10	**
4P	West Clover Creek	57	45	50	138
5C	Clover Creek	5	5	5	**
6C	San Luis Creek #1	6	6	6	**
7P	Alder	133	133	133	949
8C	San Luis Creek #2	12	12	12	**
9E	Turquoise Gulch	539	539	960	1,734
10E	Kelly Creek	566	566	900	2,460
11P	Kerber Creek	274	274	500	1,778
12C	South Kerber Creek	12	12	12	**
13C	North Kerber Creek	18	18	18	**
14E	Noland Gulch	541	541	900	1,932
15P	Nye	90	51*	170	476
16P	East & West San Luis Creek	272	262	420	853
17C	Section 35 Tract	18	20	20	**
18C	Junction	20	20	20	**
19C	Section 13 Tract	12	12	12	**
20U	Unallotted	--	--	--	**
21C	Silver Creek F.R.	8	8	8	**
22P	Piney Creek	180	171	450	629
23P	Steel Canyon	210	210	500	1,120
24P	Mirage	187	187	300	813
25E	Valley View Hot Springs	427	427	600	1,642
26Eg	Garner Creek)				**
27Eg	South)	30	None	None	**
28P	Cotton Creek	312	312	550	1,476
29C	Noland Gulch	45	45	45	**
30C	South Kerber Creek	12	12	12	**
31P	Hutchinson	79	77	100	362
32U	Unallotted	--	--	--	**
33U	Unallotted	--	--	--	**
34P	Mineral Hot Springs	744	1,030	1,450	4,061
35U	Unallotted	--	--	--	**

a/ Key to type of proposed component indicated in management unit number:
E = Existing intensive management of grazing (AMP)
P = Proposed intensive mangement of grazing (AMP)
Eg = Elimination of grazing
C = Custodial management of grazing
U = Unallotted status of range

b/ 1975 Licensed Use

c/ Average annual use. AUMs from proposed action

d/ Although production is expected to increase to the amounts shown in this column, BLM would not be committed to any additional livestock use

e/ Potential productivity for all animals (livestock and wildlife) in AUMs

* Denotes average annual use from AMPs which include pages of non-use or varying use levels

** Potential productivity of soils was determined only for the intensive management units

TABLE III-9. LIVESTOCK GRAZING ANALYSIS (cont.)

Allotment Number and Name a/	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availability d/ in 2005	Potential Productivity e/ AUMs
36P McIntyre Gulch	311	311	550	1,542
37U Unallotted	--	--	--	**
38U Unallotted	--	--	--	**
39P Findley Gulch	1,127	753	1,050	4,116
40C Calvert Fenced F.R.	14	14	14	**
41P Laughlin Gulch	453	453	800	2,797
42P Poison Gulch	884	955	1,500	6,742
43C Ward Fenced Tracts	18	18	18	**
44C Indian Creek	7	7	7	**
45P Cross Creek	300	301	650	2,811
46P Trickle Mountain	1,195	776	1,800	8,390
47P Sheep Creek	210	159*	250	1,075
48P Taylor Canyon	245	245	320	1,536
49C Meadow Fenced F.R.	20	20	20	**
50P Rabbit Canyon	289	292	350	1,612
51E Saguache Park USFS-BLM	119	119	200	900
52P Hat Springs	323	323	410	1,714
53P Robb Ranch	113	113	160	827
54C Mesa	20	20	20	**
55P Mill Hill	263	263	410	2,248
56P Higgins Spring	49	49	80	204
57P Mitchell	51	8*	80	232
58P West Tracy Ridge	50	16*	60	260
59P Tracy Ridge	44	45	90	350
60P Tracy Cattlemen's	2,842	2,847	3,350	9,958
61P Tracy Individual	99	100	180	1,397
62U Unallotted	--	--	--	**
63P Biedell Creek	172	172	250	1,241
64P East of Carnero Creek	620	630	1,200	4,810
65P Upper Coolbroth	118	74	140	557
66P Lower Coolbroth	58	29	60	257
67P Carnero Creek	Non-use	104	240	465
68P La Garita	Non-use	73	120	539
69P Elephant Rocks	200	93	250	1,036
70P Rio Grande Canal	Non-use	225	300	1,302
71C Indian Head	28	28	28	**
72C County Line	18	18	18	**
73P Alder Creek	20	13*	30	56
74Eg Masonic Park	22	None	None	**
75C Show Creek	44	44	44	**
76P Sanderson	32	21*	21	202
77P Bowen	32	21	50	117
78P Schrader Creek	Non-use	42	70	183
79P Branch	Non-use	95*	180	536
80P Pup Peak	404	404	500	1,977
81P Limekiln	370	370	500	1,487

TABLE III-9. LIVESTOCK GRAZING ANALYSIS (cont.)

Allotment Number and Name a/	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availability d/ in 2005	Potential Productivity e/ AUMs
82P Nicomodes	303	304	340	968
83P Raton Creek	384	387	440	1,444
84P Rock Creek	1,147	1,147	1,440	5,323
85P McMahon	1,310	1,287	1,550	8,983
86P Greenie Mountain	128	598	700	2,495
87P Gato-Hutchinson	228	228	270	908
88P Triangle	315	210*	420	1,925
89P Alamosa River	40	30*	80	234
90C Alamosa Prairie	11	11	11	**
91U Unallotted	--	--	--	**
92C Chicago Bogs	52	52	52	**
93P Posito Creek	218*	350	550	5,912
94P Jadero Flat	323	322	580	5,361
95P Poso Creek	206	206	260	684
96P Capulin	587	587	620	1,708
97P Romero Canyon	114	127	200	2,307
98P Ra Jadero Canyon	711	621	800	8,974
99P Cinder Pits	1,179	1,160	1,850	5,497
100E Ciscom Flat	192	192	400	1,143
101U Hot Creek	--	--	--	**
102P La Jara Creek	Non-use	30*	60	204
103C Del Rancho	12	12	12	**
104Eg La Jara Canyon	18	None	None	**
105Eg Pastures	21	None	None	**
106P Little Mogotes	1,169	1,444	1,700	5,983
107P Grande	443	436	520	4,367
108P Mogota Flat	206	206	280	1,131
109P Poso	315	276	520	1,819
110P Los Mogotes	507	652	800	4,834
111P Big Horn (Creek)	90	59*	100	435
112P Railroad	210	159	400	1,838
113P Llano	187	150	500	2,095
114U Unallotted	--	--	--	**
115P Alta Lake	711	575	1,200	3,714
116E Twin Lakes	653	653	900	2,491
117P River	200	200	280	710
118Eg Mondragon Individual	4	None	None	**
119P South Valley	139	91*	180	596
120P Pinon	392	393	600	2,058
121E Kiowa Hill	208	208	430	1,501
122P Braiden	60	60	100	294
123P Eight Mile	238	212	520	1,604
124P Pinon Hills	538	391	660	2,450
125P Rio Grande Common	860	838	1,550	4,775

TABLE III-9. LIVESTOCK GRAZING ANALYSIS (cont.)

Allotment Number and Name a/	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availability d/ in 2005	Potential Productivity e/ AUMs
126P La Sauses	141	128	260	822
127Eg Saddleback Mountain	32	None	None	**
128C Oxbow	8	8	8	**
129P Rio Grande	103	98	300	1,488
130C Allotment B	3	3	3	**
131U Emperius	--	--	--	**
132P Four Mile	Non-use	18	30	116
133P Tobin Creek	235	235	600	2,641
134P Foothills	279	257	500	2,065
135C Dow Pasture	14	14	14	**
136C Phiffer Pasture	4	4	4	**
137P Blanca Allotment (WHA)	36	48	530	1,900
138P Dry Lakes	139	139	580	2,125
139C Caldwell Pasture	13	13	13	**
140Eg Park Pasture	12	None	None	**
141P Zapata Falls	244	245	480	2,231
142C Bachelor Lake	24	24	24	**
143C Spring Pasture	10	10	10	**
144C Sand Pasture	10	10	10	**
145C Crow Pasture	40	40	40	**
146C Section 15 Lease	8	8	8	**
147C Section 15 Lease	7	7	7	**
148Eg North Pasture	40	--	--	**
149U Unallotted	--	--	--	**
150C Dry Lakes	4	4	4	**
151U Unallotted	--	--	--	**
152U Unallotted	--	--	--	**
153U Unallotted	--	--	--	**
154U Unallotted	--	--	--	**
155U Unallotted	--	--	--	**
156U Unallotted	--	--	--	**
157U Unallotted	--	--	--	**
158U Unallotted	--	--	--	**
159E Klondyke (USFS-BLM)	47	47	120	273
160C Phone Line	24	24	24	**
161C Big East	40	40	40	**
162C Hellgate	29	29	29	**
163C Sheep Trail	11	11	11	**
164U Terrace Lakes	--	--	--	**
165U Bonanza	--	--	--	**
Totals	34,999	34,626	53,557	208,442

with respect to actual use and/or carrying capacity under existing management. The bits of data available do suggest historical decreases in annual carrying capacities.

In summary, proposed use would total 34,626 AUMs annually for a reduction in licensed use of 373 AUMs. With the proposed action representing an increase in actual average annual use of about 2,000 AUMs, implementation of the proposal would thus represent a significant actual positive impact on livestock production.

Projected availability is based on the percent increase in vegetative production (as shown in table III-5, pp. III-22 f.) with the increase in production converted to AUMs*.

This assumes that the vegetative effects or impacts as described in table III-5 (pp. III-22 f.) would be achieved either through adoption of proposed grazing systems or revisions of them based on studies to be conducted after AMP implementation.

Thus, grazing would actually increase by about 2,000 AUMs, although licensed use would drop from 34,999 to the proposed use of 34,626 AUMs. Over the longer run, productivity is expected to increase to 53,557 AUMs, for a net increase of 18,558 AUMs over present licensed use. The decrease in licensed use (373 AUMs) represents a reduction of about one percent (373 divided by 34,999 = 1.07 percent), while the projected availability would show an increase of about 35 percent.

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*Projected availability is estimated AUMs available for livestock use by 2005. Total vegetation produced would be more than double this amount by weight.

Two other impacts can be expected in the future. During the years immediately following implementation of the proposed grazing systems, minor reductions in livestock weight gain might occur until operators and their livestock adjust to new pasture boundaries and movement schedules.

If the quality (vigor) and quantity of forage improve after implementation in accordance with the stated AMP objectives (table I-4, pp. I-24 f.), it is possible that the "quality of AUMs" would increase so that weight gains or productivity would also increase slightly or that additional AUMs might be made available for domestic livestock use.

Some discussion of impacts on individual allotments appears appropriate. In a few cases reductions in qualifications and use would be significant. Examples are the Findley Gulch and Trickle Mountain allotments where proposed use represents decreases of 33.2 percent and 35 percent respectively. In most cases, changes between present licensed use and proposed use are less drastic. In the case of the allotments just cited and others similar to them, or when the proposed system is a one-pasture rest rotation system, the impacts would be most significant. The actual degree of significance depends on the quantity and the quality of other private and public rangelands owned and leased. Small operators would likely be impacted most severely. Lacking specific, detailed information about each operator (total land owned or leased, financial status, size of total operation, age, business, and career goals, etc.), it is impossible to enumerate in detail the impacts of the proposal on each operator. Further, some may have financial resources and vocational alternatives not available to others. Yet, the type of impacts described here are believed typical given the operational changes that will occur. Since the estimated annual, regional, livestock industry dependency on BLM-licensed forage is less than two percent, the proposal is not expected to generate disruptions in the livestock industry. Further, these adverse impacts would likely be mitigated over the long run as forage productivity increased.

Thus, in spite of some individual and short-run adverse impacts, it appears that the overall net impact of the proposal would be beneficial, yielding an estimated 59 percent increase in actual AUMs produced annually on NRL (20,558 divided by 34,999 = 59 percent). Availability would increase by about 53 percent in the long run (18,558 divided by 34,999 = 53 percent). Note that the anticipated impacts are rather insignificant when compared with the overall demand for AUMs in the San Luis Valley when private, state, and other federal lands are included. An estimated 1,907,040 AUMs were required in 1974; an increase of 20,558 AUMs would represent only one percent of this total.

Transportation Networks

Although no road construction is intended in the proposed action, expansion of the primitive road network in the form of two-track trails is expected to evolve through use as new range facilities would be constructed and access needed to the various facilities for use and maintenance purposes. Since pastures would be fenced into smaller units, access to areas that were formerly seldom used or unused by livestock would become a necessity for livestock management. From a transportation standpoint the development of such a trail system would be a beneficial impact.

Some of the proposed improvements would more likely be responsible for the development of "permanent" trails than others. For example, permanent waters, such as spring developments, water troughs, and wells which need to be monitored periodically for proper operation would more likely result in trails than in check dams, reservoirs, fences, and buried pipelines. In the case of the latter group, likelihood of permanent trails developing would be remote once the construction phase was completed.

Although increased access to more remote areas is considered to be beneficial from the transportation standpoint, a precise measurement of this benefit cannot be made unless the extent and location of the network is known or planned. Based upon the nature of the proposed improvements and need for permanent trails to each, however, it can be estimated that 150 miles of new vehicular trails would evolve.

Archaeological Resources

Archaeological resource values could be damaged or lost as a result of the proposed action, through increased vandalism, increased erosion, breakage from livestock trampling, and construction activities.

Of the approximately 200 recorded archaeological sites in the San Luis Valley, the majority are in the Sand Dunes and Dry Lakes District (figure II-30, p. II-178) and 141 occur on one allotment. Because of the possibility of damage or loss to archaeological values at these sites as a result of the proposed action, an investigation was made to determine if livestock grazing on the Blanca Allotment (137P) should be eliminated. Blanca is typical of management units in the Sand Dunes and Dry Lakes District. It was determined that continued livestock movement over the sites would not adversely impact known archaeological values. No developments are planned on known sites; however, as stated in the design features for range improvements (p. I-54), archaeological clearance would be required prior to development of each project site.

In summary, because livestock grazing was determined not to adversely affect archaeological values and because archaeological clearance prior to construction of any improvements protects archaeological resources, impacts of the proposed action would not be significant.

Historical Resources

Twelve historical sites could be adversely impacted by livestock grazing. Table II-41 (p.II-182) gives details of the following sites that could be impacted.

	Status
1. Taos Valley Ranch, site number 1045. Possible damage by livestock from rubbing against buildings and objects at site. Possible increased vandalism due to increased access. Twin Lakes Allotment.	Private
2. Rock Cabins, site number 1046. Possible damage by livestock rubbing against structures. Possible increased human vandalism caused by increased access. Twin Lakes Allotment.	Private
3. Rock Cabin, site number 1043. Possible damage from livestock rubbing against structure. Pinon Hills Allotment.	NRL
4. Spanish Cross, site number 1047. Possible damage by livestock rubbing against object. Possible increased vandalism caused by increased access. Mogotes Allotment.	NRL
5. Ute Pass Road, site number 1056. Possible damage caused by increased use for proposed improvements. Possible damage caused by proposed pipeline. Findley Gulch Allotment.	NRL
6. Cabin at Cabin Draw, site number 1055. Possible damage caused by cattle rubbing against structure. Cross Creek Allotment.	NRL
7. Rock Creek Cemetery, site number 1053. Possible damage caused by livestock rubbing against headstones. Possible vandalism caused by increased access to humans. Rock Creek Allotment.	Private
8. Rock Creek Cabins, site number 1052. Possible damage caused by livestock rubbing against structures. Possible vandalism caused by increased access. Rock Creek Allotment.	Private

	Status
9. Jacks Creek Mine, site number 1054. Possible damage caused by livestock rubbing against structure. Possible vandalism caused by increased access to humans. Cross Creek Allotment.	Private
10. Chiquita Peak Graves, site number 1038. Possible damage caused by livestock movement. McMahon Allotment.	NRL
11. Hodding Creek Grave, site number 1072. Possible damage caused by livestock rubbing against fence and markers. Possible vandalism caused by humans. Mill Hill Allotment.	Private
12. La Garita Wagon Ruts, site number 1057. Possible damage caused by the movement of cattle on a large scale across the area. Carnero Creek Allotment.	NRL

Range project construction is not expected to have any direct impact on historical sites; any primitive roads which may evolve would provide more access to sites and increased vandalism could be expected.

Figures III-1, III-2, and III-3 show the damage that can be done to historical sites as a result of cattle rubbing and human vandalism.

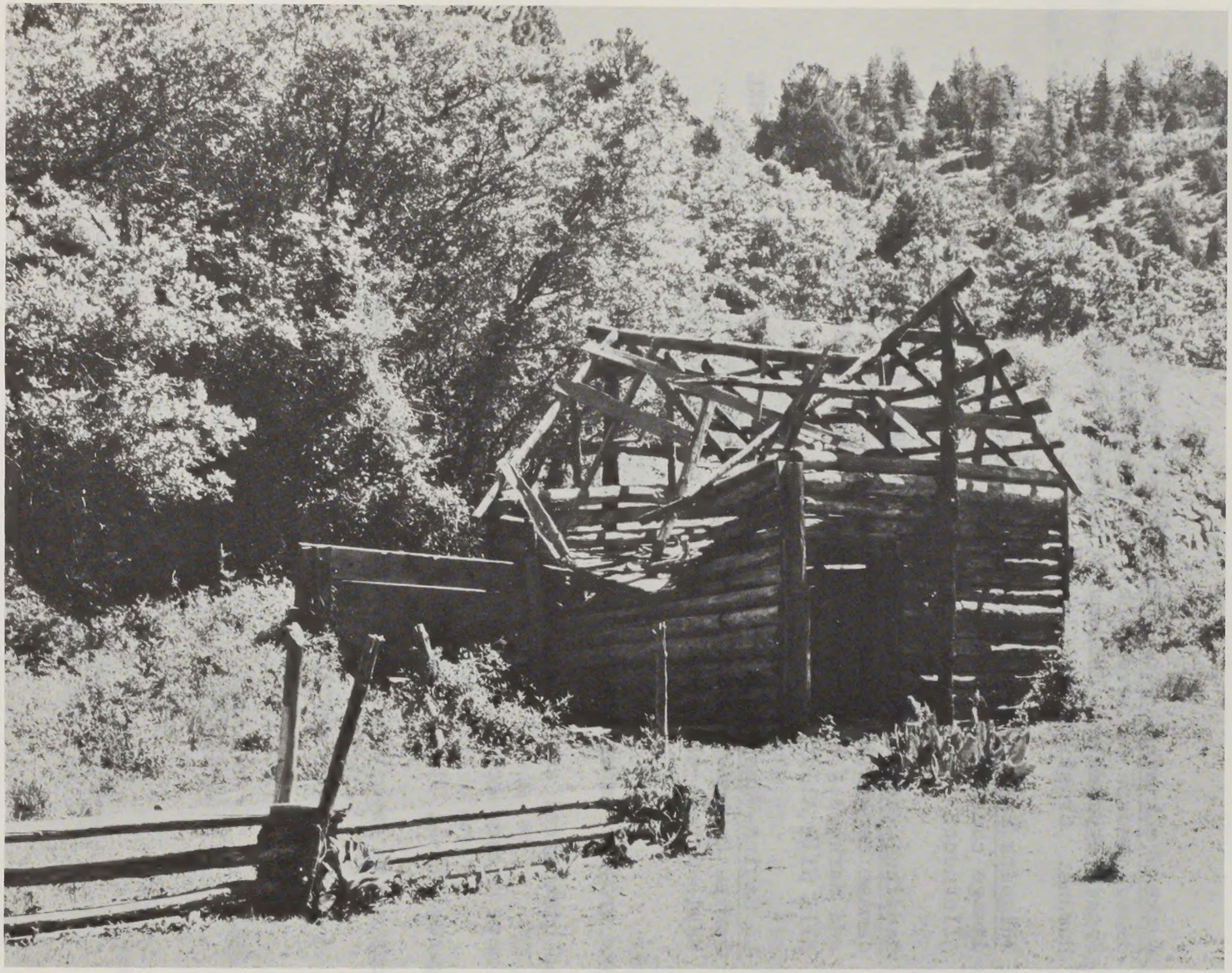

Figure III-1. Historical site photographed June, 1973. This shows the appearance of the site when it was formally inventoried. Cattle had been using the building for shelter for some time and were driven out just prior to the photograph being taken.

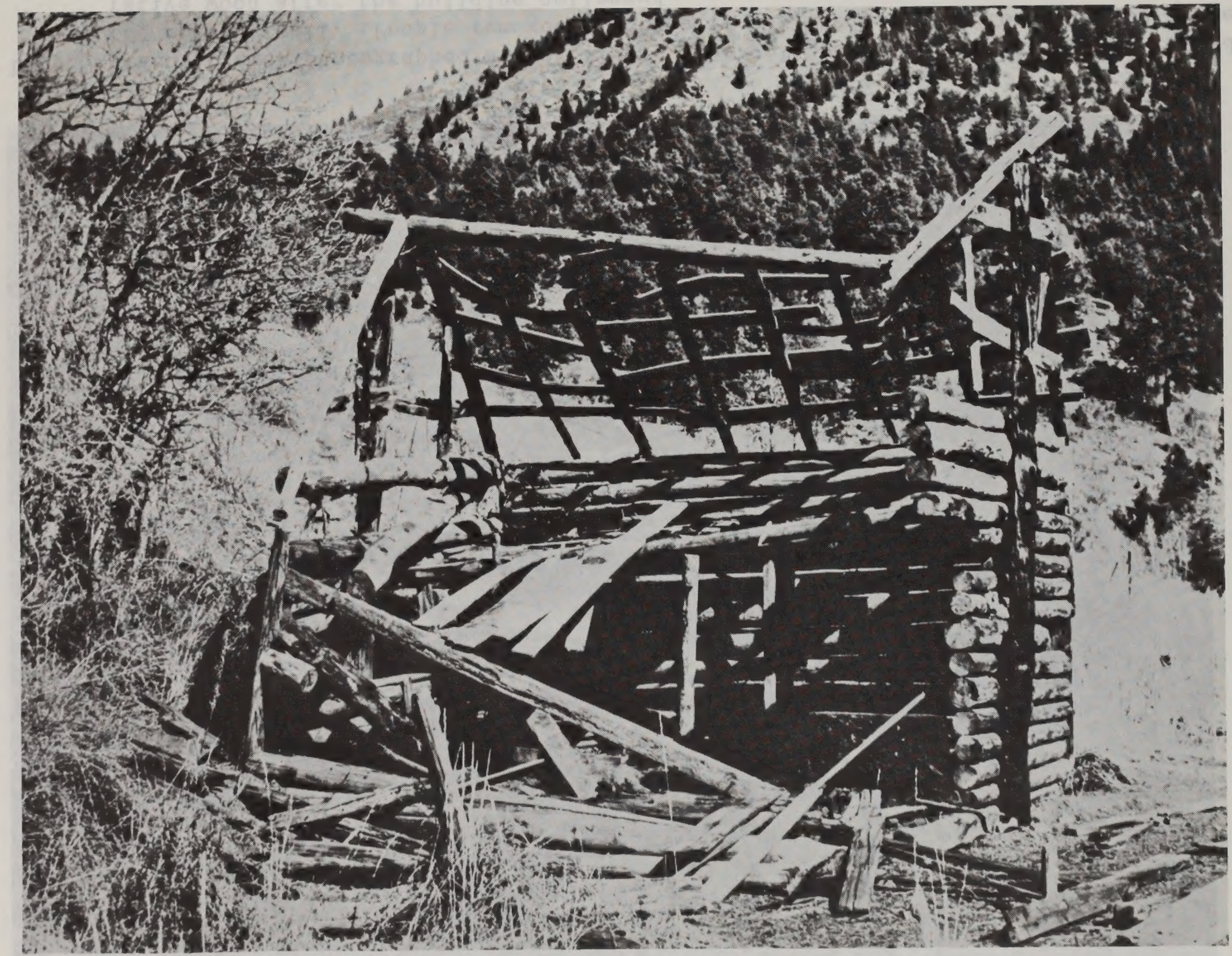

Figure III-2. Historical site photographed March, 1974. The wall collapsed due to cattle using the building for shade and shelter and rubbing against the walls. Some fence materials were removed by people.

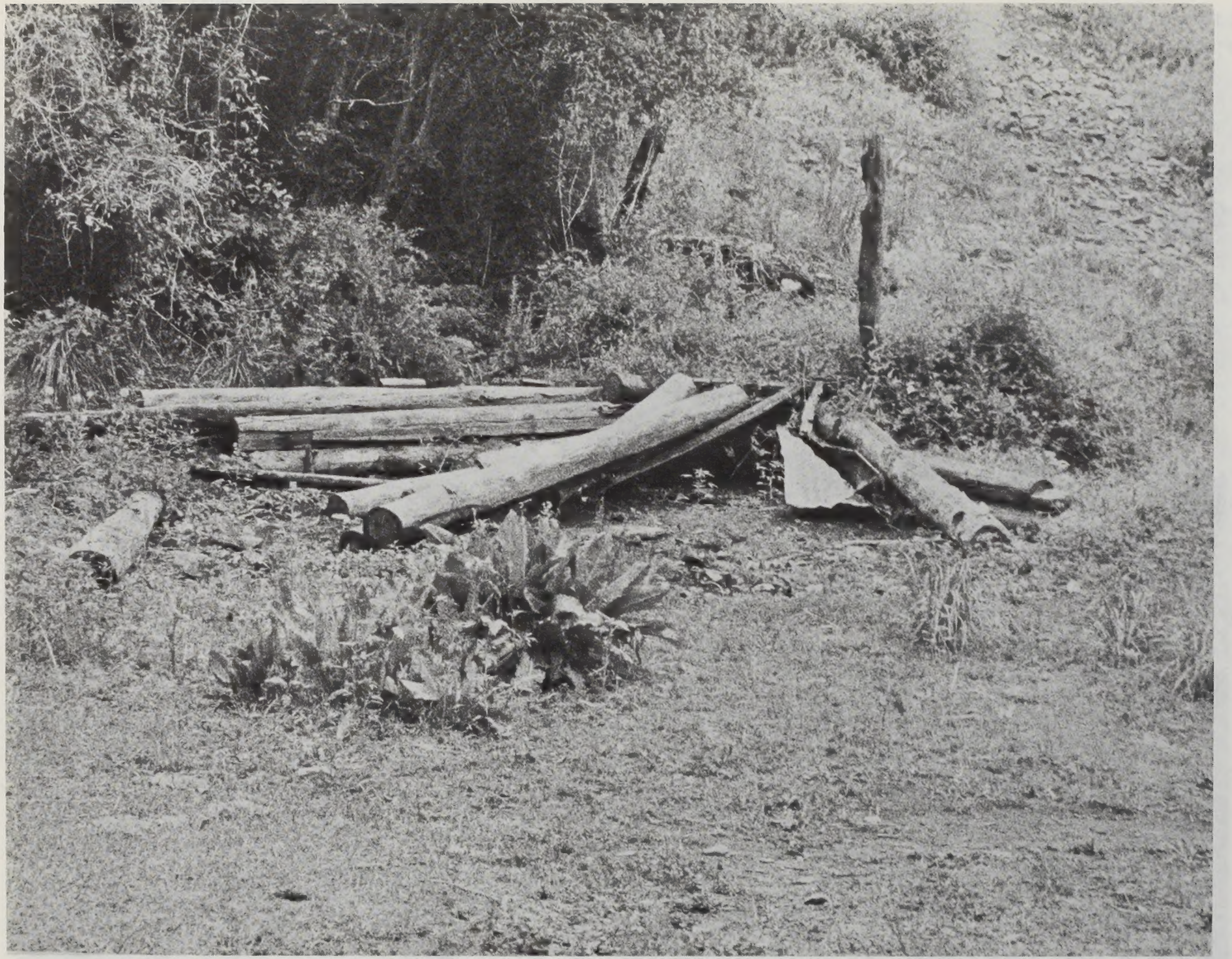

Figure III-3. Historic site photographed August, 1975. The collapse of the building was caused by the missing wall. People removed practically all the material for firewood or decorative wood after the building collapsed.

Aesthetics

The only component of aesthetics that would receive any appreciable impacts from the proposed action is visual resources.

Visual Resources

Each of the major range improvements was analyzed to determine how much it would contrast with the "natural" landscape typical of the San Luis Valley. Relative ratings were given to each improvement concerning its contrast with existing landscape structure, vegetative patterns, and landform for both foreground and middle ground. These summary data and the highest contrast noted for a single factor used to determine the foreground and middle ground contrast ratings are shown in table III-10. When these data are compared to the maximum contrast ratings for each visual class given in table III-11, it is readily apparent that some of the proposed project work would exceed the maximum visual impact allowable in the foreground and middle ground of Class II areas and the foreground of Class III areas (catchments only). Table III-12 is a summary of the relatively harmonious and discordant visual impact situations. When the conditions outlined in table III-12 were compared to the proposed projects, eight AMPs in the proposed action were found to contain range improvements that could produce or appear to produce discordant visual impacts. The eight AMPs are discussed in the subsequent paragraphs.

TABLE III-10. CONTRAST RATING SUMMARY

Project	Structure		Vegetative Pattern		Landform		Single Factor Maximum a/	
	Fore-Ground	Middle Ground	Fore-Ground	Middle Ground	Fore-Ground	Middle Ground	Fore-Ground	Middle Ground
Fences	16	3	9.5	7.5	0	0	moderate	moderate
Buried pipelines	0	0	6	0	6	6	low	low
Wells with pumphouses	10	6	6	5	3	3	low	low
Wells with windmills	16	5	6	5	3	3	high	low
Troughs	10	6.5	12.5	6.5	0	0	moderate	low
Spring development	6	0	5	2	0	0	low	low
Earthen dams and reservoirs	0	0	7.5	7.5	11.5	9.5	moderate	low
Catchments	26	16	15.5	11.5	14	5	high	moderate
Metal cylindrical storage tanks	14	9	6	5	3	3	moderate	low

TABLE III-11. MAXIMUM CONTRAST RATINGS FOR EACH VISUAL CLASS

Class	Short-term	Long-term	Limit for a Single Factor
II	13	10	Low
III	20	16	Moderate
IV	24	20	---
IV*	27	20	---

* For "structure" category only

TABLE III-12. VISUAL IMPACT SUMMARY BY CLASS *

	Class II		Class III		Class IV	
Project	Fore-Ground	Middle Ground	Fore-Ground	Middle Ground	Fore-Ground	Middle Ground
Fences	X	X	0	0	0	0
Buried pipelines	0	0	0	0	0	0
Wells with pumphouses	0	0	0	0	0	0
Wells with windmills	X	0	0	0	0	0
Troughs	X	0	0	0	0	0
Spring development	0	0	0	0	0	0
Earthen dams and reservoirs	X	0	0	0	0	0
Catchments	X	X	X	0	0	0
Metal cylindrical storage tanks	X	0	0	0	0	0

* 0 indicates harmonious impact, X indicates discordant impact.

Poncha Pass West Allotment. A segment of fence that forms the boundary between the north pasture and east pasture lies within a Class II foreground. An examination of a topographic map showed that only the first one-fifth mile (intersecting U.S. Highway 285) would be visible to the passing motorist. This one-fifth mile segment would constitute the discordant visual impact.

W.C. Hutchinson Allotment. The stock watering trough proposed for pasture #2 lies within a Class II foreground; however, it would be screened from view by a pinyon-juniper stand and would actually produce no visual impact.

Mineral Hot Springs Allotment. The stock watering trough proposed for the southwest corner of Section 36 in the Mineral Hot Springs pasture lies within a Class II foreground, thereby producing a discordant visual impact.

Adler Creek Allotment. The proposed watering trough appears to lie within a Class II foreground; however, due to local topography it would not be visible in the foreground.

South Valley Allotment. The earthen reservoir proposed for construction in Section 4 would not exceed the recommended maximum contrast for its location. However, the visual impacts it would produce are higher than necessary and could be reduced.

Foothills Allotment. The proposed boundary fence between the north pasture and the south pasture lies in Class II foreground and middle ground. Close inspection reveals that the portions in Section 5 and the east half of Section 6 (T 29 S, R 73 W) would be fully screened from view by a stand of pinyon-juniper. The portion of the proposed fence that would exceed the maximum visual contrast recommended in this location is visible in the west half of Section 6 (T 29 S, R 73 W) and all of Section 7 (T 38 N, R 13 E).

Zapata Allotment. The proposed fences in sections 32 and 33 and in Section 5 would be located in Class II foreground and middle ground. Due to vegetative screening, only the east-west portions of fence in the west half of Section 32 would actually be visible.

Summary. Many of the proposed projects located in Class II and III background and seldom-seen areas would produce discordant visual impacts when actually viewed by the public. However, since their locations are so infrequently visited by the public and no primitive values are involved, the impacts would be considered insignificant.

Socio-Economic Conditions

Population

The proposed action would have no impacts on population levels and composition.

Income

As noted in Chapter II, the San Luis Valley is a relatively poor area which contains 1.5 percent of Colorado's population and produces 1 percent of its income. The proposed action would generate impacts in four sectors of the economy.

Range Livestock Related Income

Upon full implementation of the proposal, the number of AUMs of livestock grazing licensed annually would be 373 AUMs less for the short term than current levels. However, actual average annual use would increase by about 2,000 AUMs. This increase would yield an estimated $3,120 increase in direct livestock related income (2,000 X $1.56 = $3,120). Given the range livestock income multiplier (1.535), the total direct and indirect income effect would be $4,789. This positive income effect is insignificant when compared with the 1969 estimated San Luis Valley range livestock income of $2,568,000 or the total regional income of $59,995,000.

Over the longer term, productivity of the vegetative resource is expected to reach a level where, within 20 years of implementation, the projected availability would increase to 53,557 AUMs annually. While no firm commitments exist regarding the future allocation of this forage, this productivity level represents an increase of 18,558 AUMs annually over present licensing levels. Estimated total availability would be increased by about 20,558 AUMs over present actual use. In 1970 dollars, the direct livestock related income effect was $30,837 annually (20,558 X $1.50 = $30,837) with the direct and indirect effects totaling $47,335 annually ($30,837 X 1.535 = $47,335). This larger, long-term potential is still only 1.8 percent of the 1969 estimated San Luis Valley range livestock income.

Contract Construction Related Income

Implementation of the proposal according to the improvements and schedule shown in tables I-7 (p.I-52), I-8 (p.I-53), and I-9 (pp. I-72 f.) yields the improvements and costs shown in table III-13. As table III-13 shows, construction costs over the implementation period would total $1,603,955 (including $27,300 of improvements to be provided by allottees). If an estimated 20 percent of total construction costs would be retained by region households, the annual income effects of the proposal would be the amounts shown in the bottom line of table III-13. These amounts represent 1.59 percent, 3.3 percent, 1.98 percent, 1.96 percent, 0.36 percent, 0.57 percent, and 0.28 percent, respectively, of the 1970 regional contract construction income of $3,194,802 for the seven years involved.

TABLE III-13 SUMMARY OF PROPOSED IMPROVEMENT, ESTIMATED CONSTRUCTION COSTS, AND ANNUAL MAINTENANCE COSTS

Improvement Item	Unit	Proposed Improvements and Estimated Construction Costs by Year of Occurrence														Total, All Years		Maintenance Rate (% of Initial Costs)	Total Annual Maintenance Costs
		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7					
		No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars		
Water Developments																			
Wells	No.	5	58,900	8	95,400	9	90,300	--	--	--	--	--	--	--	--	22	244,600	3	7,338
Springs	No.	15	12,000	3	2,400	2	1,600	--	--	5	4,000	2	1,600	--	--	27	21,600	6	1,296
Catchments	No.	4	68,000	2	32,000	--	--	--	--	--	--	--	--	--	--	6	100,000	4	4,000
Pipelines	Miles	9.63	24,075	51.02	127,550	37.75	94,375	42.72	106,800	3	7,500	10.5	26,250	1	2,500	155.62	389,050	10	
Easements	Miles	1	4,000	--	--	2	8,000	1	4,000	--	--	--	--	--	--	4	16,000	--	--
Storage Tanks	No.	--	--	8	32,000	8	36,000	3	12,000	--	--	--	--	2	8,000	21	88,000	2.5	2,200
Water Troughs	No.	23	4,600	60	12,000	51	10,200	52	10,400	9	1,800	16	3,200	1	200	212	42,400	10	4,240
Reservoirs	No.	10	20,500	23	39,600	2	3,000	5	5,500	2	4,000	4	8,000	--	--	46	80,600	5	4,030
Fences																			
Electric	Miles	6.5	6,500	--	--	--	--	--	--	--	--	--	--	--	--	6.5	6,500	5	325
New (3-wire)	Miles	22.2	44,400	85.35	170,700	30.4	60,800	76.03	152,060	19.4	38,800	24.76	49,520	14,45	28,900	272.59	545,180	2	10,904
Easements	Miles	--	--	0.5	2,500	--	--	--	--	--	--	--	--	--	--	0.5	2,500	--	--
Removal	Miles	--	--	--	--	--	--	4	8,000	--	--	0.38	760	--	--	4.38	8,760	--	--
Repair	Miles	--	--	--	--	6.5	3,250	--	--	--	--	0.75	750	4.5	4,500	11.75	8,500	2	170
Other																			
Bound. Markers	No.	370	1,850	760	3,800	763	3,815	105	525	90	450	175	875	30	150	2293	11,465		
Cattleguards	No.	6	8,400	4	5,600	3	4,200	7	9,800	1	1,400	--	--	--	--	21	29,400	2	588
Check Dams	No.	--	--	32	3,700	6	1,100	8	4,600	--	--	--	--	--	--	46	9,400		--
Totals			$253,225		$527,250		$316,640		$313,685		$ 57,950		$ 90,955		$ 44,250		$1,603,955		73,996
Income Effects on Local Households a/			$ 50,645		$105,450		$ 63,328		$ 62,737		$ 11,590		$ 18,191		$ 8,850		$ 320,791		$ 322,198.80

a/ Estimated at 20 percent of initial installation costs and 30 percent of maintenance costs

NOTE: Construction of all range improvements would be completed by the end of the seventh year after implementation of the proposal.

These annual impacts, while not large, would represent a beneficial impact in a region where incomes are generally low. The actual magnitude and the significance of these impacts are dependent upon the number of contractors and labor force employed from the San Luis Valley.

Annual expenditures for maintenance of improvements represents an ongoing impact in the region. Table III-13 (p.III-110) summarizes by improvement type the maintenance impacts based on maintenance rates estimated as a percent of initial costs. Estimated total annual maintenance costs would be $73,996, or 4.6 percent of initial construction costs. Since maintenance is expected to be more labor intensive than construction, an annual income effect of $22,199 is estimated, assuming that 0.30 percent of the costs would be retained by region households. These annual maintenance costs represent 0.73 percent of the 1974 regional construction income.

As with initial construction, the beneficial impacts could be maximized if local labor and contractors were utilized.

The maintenance costs have both positive and negative dimensions. On the positive side the increased income to valley residents (contractors and laborers) would be welcomed. However, since much of the actual maintenance would be assumed by allottees as a condition of AMP implementation, it would be viewed by ranchers as an additional operating expense.

In summary, while some maintenance costs would be borne by the federal government, it appears that most of the beneficial income impacts on construction workers, ranch hands, and so forth would come at the expense of the livestock operators and thus represent an adverse impact to the extent that these costs exceed the value of additional AUMs of grazing produced. This latter adverse impact exerts additional pressure on the cost-price squeeze being experienced by range livestock operators.

Recreation-Related Income

An earlier section indicated that sportsmen's expenditures in the San Luis Valley totaled an estimated $16,094,526 in 1973. A preceding section in this chapter, "Wildlife," indicated that the proposal would provide habitat for increased big-game populations. The increases in numbers of animals by species are bighorn, +50; antelope, +207; mule deer, +222; and elk, +130. These numbers represent increases of present total herds of 17 percent, 18 percent, 3.46 percent, and 2.71 percent, respectively. Applying these percentage increases to sportsmen's expenditures by game species, as indicated in the Survey of Sportsmen Expenditures for Hunting and Fishing in Colorado (Colorado State University 1975), suggests that sportsmen's expenditures in the San Luis Valley would increase by a total of $151,303 if game management practices would allow population increases consistent with habitat improvement.

If about 20 percent of these expenditures would be retained as income by valley residents, the regional income impact would be an additional $30,260. As in earlier situations, this impact would be small when compared to the total income of the San Luis Valley; yet the impact is beneficial and would generate additional income and employment. The increased big-game numbers would provide the basis to satisfy existing demands for hunting opportunities.

A report prepared by the Colorado Division of Wildlife (1974) indicates that with respect to antelope, demand already exceeds the supply of hunting opportunities. Hunting is by permit only, with harvest totaling about 20 percent of the pre-season population. Reduced levels of harvest are planned until optimum population numbers are achieved. The proposed action appears to coincide with state policy and would allow additional hunters and non-consumptive users an opportunity to satisfy existing demands.

With respect to bighorn sheep, hunting demand exceeds supply by several times. Since hunting is by permit only and stated policy is to increase population numbers, the proposed action would provide hunting opportunities to an expanded number of hunters as well as provide animals for non-consumptive type uses.

With respect to deer, the demand for hunting opportunities is expected to exceed supply before 1980. Thus, future hunting restrictions and hunting by permit only are implied. Stated goals and policies include expansion of existing populations, provision of a wider array of hunting opportunities, and improvement of habitat including elimination of habitat conflicts with other game species such as elk.

In the case of elk, the report indicates that current levels of hunting demand cannot be maintained without reducing success levels.

Demand is expected to exceed supply before 1980; however, a combination of permits and some general licenses are planned. Stated management strategies include provision of maximum habitat and control of factors that would limit herd size.

Thus in the case of all four big-game species, the data suggest that while hunting demand is increasing regardless of the proposed action, the proposal would assist the Colorado Division of Wildlife in achieving stated objectives as well as provide consumptive and non-consumptive use opportunities that would not exist otherwise. The economic impacts described earlier represent a best estimate of the gross economic and income impacts of realizing the recreation effects.

Other Income Effects

In order to supervise the installation of improvements, assist with maintenance, assure that allottees are following the grazing systems prescribed in the AMPs, check for trespass violations, and so forth, several additional employees would be hired by BLM. Current proposals call for six additional employees including a range conservationist, wildlife biologist, range technician, a part-time clerk-typist, and two engineering technicians (the latter would be located in Canon City and would be associated with the proposed action primarily during the implementation phase). Annual salaries for the employees would total approximately $70,000 annually. Of this total $23,200 would go to two employees in Canon City while the remainder ($46,800) would represent a beneficial income impact in the San Luis Valley. (Net salaries would be less than the amounts indicated; however, the multiplier effect would increase local impacts to nearly the levels indicated above.) In this situation, however, the impact might generally be viewed as negative by taxpayers. A further impact would be the expansion of the government sector of the regional economy, currently the largest sector.

For all sectors, the proposed action would increase range livestock related income by $4,789 annually. As the full effects of the proposal would be realized, the longer term range livestock income potential would increase to $47,335 annually. Improvement-related income impacts would total an estimated $320,791 over the implementation period, with annual maintenance requirements generating an estimated $22,199 in income annually. Increased expenditures by sportsmen would also increase regional income by approximately $29,448 annually, after implementation, with government employment/income adding about $70,000 annually.

In summary, the local income would increase over $125,000 annually during the eight-year implementation period and over $100,000 annually after that period. Since the increased forage production is not committed to livestock grazing, no income increase is included in these figures. On the other hand, increased costs for maintenance would be nearly $75,000 annually.

Employment

The proposed action would generate some additional employment. As indicated in the preceding section, government employment would be increased by six positions. The employment would start with the initiation of the proposal and continue indefinitely during the operation of the grazing systems.

During the implementation phase, a seven-year period, 26.7 man-years* of construction employment would be generated, with the majority of the employment concentrated during the first four years of implementation. After the eighth year, when all AMPs would be implemented, the combined maintenance and wildlife (hunting) income impacts would generate an estimated five man-years of employment.*

Most of the employment impacts would be spread over many ranchhands and operators and employees of wholesale and retail firms. The additional income can be viewed as creating new jobs, whether they be additional work for existing employees or totally new jobs.

The production of additional AUMs of livestock forage would not likely generate any new employment since existing ranches would likely experience some economies of scale and handle any expansion with the existing work force.

In summary, the permanent employement impacts would total an estimated eleven or twelve man-years annually. This impact, while beneficial, is relatively insignificant when viewed in the context of total regional employment of 13,810 in 1973.

Social Well-being

The discussions of income and employment in the preceding sections indicate that regional social well-being would be slightly improved, but the magnitude of current deficits and problems suggests that the impacts would be insignificant. This proposal can in no way be viewed as being an action that would correct existing inequities.

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*Assumes an annual average salary of $12,000.

Socio-Cultural Attitudes

To the extent that the proposed action would stimulate the region's economy, protect natural resource values by enhancing the vegetative resource, increase wildlife populations, and increase or stabilize domestic livestock grazing levels, the proposal would be in harmony with existing values and attitudes.

The imposition of more restrictive or detailed management practices, including some reductions of grazing privilege by "federal bureaucrats" would conflict with both "local determinism" and "operator prerogative" (laissez-faire) attitudes and values. Further, the imposition of increased operational costs on operators already facing a cost-price squeeze could be expected to generate substantial local opposition.

While some national-regional groups may view the proposal as an improvement over current resource management programs with respect to provision for wildlife or other resource values, it seems likely that substantial national debate about the advisability of the proposal may follow.

Other Social Support Facilities and Services

As indicated in Chapter II, the collective impacts of the proposed action would not be expected to have any measurable impacts on social support facilities and services. In view of the insignificant impacts on population and employment, that judgment remains valid. Income effects, both those judged beneficial and those deemed adverse, suggest no impacts on such social support systems as schools, health facilities, and so forth.

One impact that should be noted would involve the reduction in grazing qualifications, whether through eliminations, reductions caused by range unsuitability, or suspended non-use. These reductions, totaling 2,450 AUMs of grazing annually, would translate into a loss of 204.17 animal units of allowable use. Since no guarantees exist regarding the availability of future increased forage production, it seems appropriate to note that the value of affected ranches and the local tax base would be decreased.

Studies suggest that the value of livestock ranches is about $1,000 to $1,200 per animal unit of carrying capacity. Thus, if allowable use would be reduced by 204.17 animal units, the present value of future income and related improvements would be decreased by about $204,170. This loss or impact would be felt by present owners. A related loss would involve the decreased tax base. In Colorado, property is assessed generally at about 30 percent of its market value. The loss in the tax base would amount to about $61,251, which would represent only about 0.05 percent of the current regional total assessed valuation (Colorado Division of Property Taxation 1974).

It should be noted that in Colorado agricultural land prices reflect the influence of demands for land other than future ranch income possibilities. Thus, there is little likelihood that actual ranch base property values would be reduced. Values would likely not increase in proportion with other similar properties which experience no reductions in carrying capacity.

Decreases in proposed and future potential grazing levels would affect some operators, and the impact should be viewed on an individual operator-by-operator basis (see table III-9, pp.III-89 f.). The loss of some "paper" or real use qualifications would imply some loss of base property values since the AMPs include no commitments with respect to allocation of future vegetative productivity above the proposed action levels.

From another point of view, no real net losses in actual carrying capacity would be experienced, and actual use would likely increase, especially over the longer run as the effects of grazing management are realized.

The increase in projected future availability of forage of 18,558 AUMs (projected availability minus licensed use) would represent an increase of 1546.5 animal units if allocated to users. Valued at $1,000 per animal unit of carrying capacity, base property values would increase by $1,545,500 over existing levels. Assessed valuation would increase by 0.23 percent over the 1974 total regional valuation, not a significant change in the regional tax base.

In conclusion, it should be noted again that no commitment to allocate this forage exists, and its real availability is dependent on successful implementation of the proposed action.

CHAPTER IV. MITIGATING MEASURES

The measures analyzed in this chapter are actions that would reduce or eliminate adverse impacts of the proposed action identified in Chapter III. As such, mitigating measures are taken in addition to the proposed action, not altering the action itself. Each measure is analyzed in relation to a specific component of the proposed action. All measures are considered feasible under existing technology and would be required if the proposed action is implemented. The measures would apply equally to NRL and any private lands on which an easement is involved.

Water

Information on the hydrologic processes in the San Luis Valley is insufficient to allow the Bureau to adequately predict impacts of a grazing system on hydrologic outputs and erosion/sedimentation responses. The Bureau, however, would initiate, upon implementation of the proposed action, a hydrologic monitoring program in the valley. A comprehensive watershed hydrology assessment of grazing systems has never been conducted by the BLM.

Various climatic, hydrologic, soil, plant cover, channel, watershed geometry, snowpack, and infiltration parameters would be monitored within a tightly designed network so as to establish a data base from which processes could be characterized, questions could be answered, and the grazing systems could be quantitatively assessed.

Results of these studies would be used as follows: (1) grazing season of use and intensity would be related quantitatively to stream flow, soil water, and water quality responses; (2) recommendations for changes in livestock grazing system could be made; and (3) impacts presently unidentified in this environmental statement would be known and quantifiable upon completion of the study.

Wildlife

The elimination of surface water as a result of spring construction of range improvements would be avoided by placing a wildlife guzzler (wildlife watering facility) on the pipeline near the spring collection box, thus providing a continued water source for wildlife at or near the original spring location.

There are no known critical habitats of endangered species within the San Luis Resource Area. However, prairie dog colonies provide potential habitat for the endangered black-footed ferret in many areas of the resource area, and the presence of ferrets is considered highly probable in the Little Mogotes and Punche Valley areas. The only significant impact if black-footed ferrets were present would be destruction of their habitat and the possibility of drowning them during the filling of reservoirs. This possibility would be minimized by conducting field investigations of all proposed reservoir sites to determine if prairie dogs are present and, if so, the relative potential of the area as black-footed ferret habitat. Reservoir sites would be relocated if the potential as ferret habitat is considered significant.

Aquatic and Riparian Communities

Fences across streams tend to catch debris and trash. As they accumulate, water builds up behind the clogged structure, resulting in lateral stream bank erosion and down cutting into the streambed, thus destroying aquatic and riparian communities.

Fences that cross permanent streams would be constructed so that debris would not build up behind them. One way to do this is with the "swing type" fence, which is supported by a cable across the stream so that it has no attachment to the streambed. A problem with this type of fencing is its tendency to stick open after flooding, allowing livestock to escape confinement.

Cattle crossing the Rio Grande from private land on the east bank to trespass graze on NRL along the west bank would result in continued decline of riparian vegetation on the La Sauses, Rio Grande Common, and Pinon Hills allotments. Therefore, nine 50' x 300' exclosures would be constructed along 7 miles of the west bank. In addition, woody vegetation would be planted. Once these plants were established, they would be expected to spread outside the exclosed area. If the method proves successful, additional exclosures would be built.

Impacts of the proposed grazing systems on the riparian and aquatic communities which exist along the Lone Tree, Swidinski, Merkt, Decker, Rock, Yankee, Bolton, Nieland, Butterfly, Raspberry, Brook, Cook, Miller, Jack, and Carr creeks cannot be determined until the condition of these communities has been inventoried and classified (see table II-15 (pp.II-50 f.) for locations of these streams).

Various studies would be established on these streams to identify the effects or impacts of the proposed grazing systems, and AMP modifications would be made if deterioration (adverse impacts) began to occur. All proposed spring developments would be inventoried for relic and/or endemic populations of snails, amphipods, isopods, mites, fish, and plants. If any are located, spring construction and operation would be carefully monitored to prevent destruction of their habitat.

Land Use

Recreation

Pedestrian walk-through breaks would be designed into fences constructed across fishable streams to reduce the "nuisance" impact to the public.

The gates in the Poncha Pass West and Alder allotments would be left open in the winter to allow snowmobile passage.

Archaeological Resources

Salvage archaeology would be used only as a last resort. Project locations would be changed before salvage archaeological methods are used.

If a significant increase in erosion in an area is detected through monitoring allotment responses to their respective grazing systems, that area would be fully inventoried for archaeological sites. If sites are located that are considered significant by qualified professionals, the areas would be fenced to exclude livestock and appropriate stabilization measures would be taken.

An archaeological inventory of spring sites and their immediate areas would be conducted. If significant sites are found, their condition would be carefully monitored. If livestock do damage significant sites, the areas would be fenced to exclude livestock.

Historical Resources

Of the twelve historical sites identified within the area of the proposed action, six are located on NRL; these six sites will be recorded under the Historic American Building Survey (HABS). Four sites would be fenced (clearance for fence construction would be required in accordance with Section 106 of the National Historic Preservation Act of 1966) to exclude domestic livestock, which would prevent further damage from livestock rubbing and trampling. These sites are the rock cabin on Pinon Hill Allotment (Site #1043), the Spanish cross on Mogotes Allotment (Site #1047), the cabin on Cabin Draw in Cross Creek Allotment (Site #1055), and Chiquita Peak Graves on McMahon Allotment (Site #1038). The Colorado State Historic Preservation Office and private landowners would be notified of the location of the six historic sites on private land.

A more general mitigation would be to increase the inventory and the discovery of unknown historic sites. This increased inventory would include a literature search of secondary and primary materials, the preparation of a brief narrative of the area, and a Class I field survey to verify and record unknown sites. By using the technique of inventory as a mitigation (as opposed to standard 106 2(b) clearance), sites that might be lost through lack of knowledge would be preserved.

Aesthetics

Internal combustion motors used in the construction and operation of projects and in the operation of the grazing management programs would be adequately muffled, which would reduce the noise impact to an acceptable level.

All projects would be placed, if possible, in locations that provide maximum topographic and vegetative screening from the public's view. Construction of pipelines laterally along side slopes would be avoided. Construction of fences along ridge lines would also be avoided.

CHAPTER V. ADVERSE IMPACTS THAT CANNOT BE AVOIDED

This chapter presents an analysis of the unavoidable adverse impacts that would result from implementation of the proposed action. These impacts are those residual impacts occurring after application of the mitigating measures described in Chapter IV.

Soils

A total soil loss of 12,330 tons would result from construction of improvements on AMPs, and another 79 tons would be lost where fencing would be required for elimination of grazing. An annual soil loss of 318 tons is expected to occur as unplanned roads and trails evolve.

Water

During infrequent, high-intensity (50 year) storms, an increase of 5,188 to 8,647 tons of sediment would occur from sheet, rill, and channel erosion on 50 spring-summer grazing units.

Increases in the discharge regime that attend such intense storms would have less impact on first-order channels than second- and third-order ones. Sediment production would increase in proportion to channel erosion. For most watersheds, sediment delivery would be restricted to alluvial fans ringing the basin and alluvial fills common on lower-gradient stream channels.

The above adverse impacts would be restricted to those drainage areas dominated by the 50 summer-grazing systems rather than being basin-wide. Further, these adverse impacts would occur very seldom and would be of very short duration.

An important unavoidable adverse effect of the proposed range improvements is that no earthen reservoirs, check dams, or other structural channel controls could be designed to withstand the impact of very large, intense storms (those occurring no more than once in 75, 100, or 500 years). If there were a structural failure, there would be a significant increase in channel erosion accompanying flash flooding after the failure. While no hydrologic studies have been conducted to ascertain the scope of the effects of such an event, there would probably be little danger to human life or property if failures of these structures should occur.

Vegetation

Temporary loss from production of 485 acres of terrestrial vegetation would be expected due to construction of proposed range improvements. Unavoidable, permanent (or for the life of the projects) removal of vegetation would occur from the following proposed projects: (1) fences, 29.2 acres; (2) catchments, 1.2 acres; (3) storage tanks, 3.6 acres; (4) water troughs, 42.4 acres; (5) reservoirs, 9 acres; (6) springs, 5.4 acres; (7) wells, 2.2 acres; (8) cattleguards, 2.1 acres; and (9) check dams, 8 acres. The total area affected is estimated at 104 acres. Another 37 acres would be removed from production due to unplanned roads evolving through increased maintenance and supervision.

Individual pastures grazed during spring and summer would show a short-term decrease in plant vigor, reproduction, litter accumulation, and seedling establishment.

Wildlife

Two AMPs, Carnero Creek and La Garita, would show a definite adverse impact resulting from the proposal. On these, competition between livestock and deer and elk is expected to result from any livestock grazing. In addition to these AMPs, there are others, identified in table V-1, that would result in overall improvement of wildlife habitats; but continued competition between livestock and big-game animals would be expected. The grazing systems would not provide for optimum quantity and quality of forage for elk, deer, and antelope. The overall carrying capacity of the San Luis Resource Area would be no more than 5 percent less than optimum for deer and elk and no more than 10 percent less than optimum for antelope.

All new fences would be an unavoidable impediment to movements and safety of big-game animals. Approximately five big-game animals would die annually as a result of entanglement in the proposed fences. The residual impact of these new fences would not be significant to movement patterns and population trends of big-game herds.

The minor disturbance to wildlife by people and machinery during construction of proposed projects could not be avoided. Destruction of habitat would also be unavoidable, but it would involve an insignificant proportion of the total habitat and be short-term, for the most part.

TABLE V-1. POTENTIAL UNAVOIDABLE ADVERSE IMPACTS OF GRAZING SYSTEMS ON TERRESTRIAL FAUNA

Allotment Number and Name		Unavoidable Adverse Impacts
31P	Hutchinson	Horse grazing from 6/1 to 2/28 could result in competition for browse with deer.
36P	McIntyre Gulch	Late fall cattle grazing could result in competition for browse with deer and antelope.
48P	Taylor Canyon	Late fall cattle grazing could result in competition for browse with deer and elk.
52P	Hat Springs	Late fall cattle grazing could result in competition for browse with deer and elk.
60P	Tracy Cattlemen's	Winter sheep grazing could result in competition for browse with deer and elk in some years.
67P	Carnero Creek	Fall sheep grazing could result in competition for browse with deer and elk.
68P	La Garita	Fall sheep grazing could result in competition for browse with deer and elk.
70P	Rio Grande Canal	Fall sheep grazing could result in competition for forage with antelope.
80P	Pup Peak	Winter sheep grazing could result in competition for browse with deer and elk.
82P	Nicomodes	Spring and winter sheep grazing could result in competition for browse with deer and elk.
85P	McMahon	Fall and winter sheep grazing could result in competition for forage with deer, elk, and antelope.
86P	Greenie Mountain	Spring and fall sheep grazing could result in competition for forage with deer, elk, and antelope.
87P	Gato-Hutchinson	Winter sheep grazing could result in competition for forage with deer, elk, and antelope.
88P	Triangle	Winter sheep grazing could result in competition for forage with deer, elk, and antelope.
95P	Poso Creek	Winter sheep grazing could result in competition for forage with antelope.
96P	Capulin	Fall and winter sheep grazing could result in competition for forage with antelope.
106P	Little Mogotes	Spring and winter cattle grazing could result in competition for browse with deer, elk, and antelope.
107P	Grande	Spring and fall sheep grazing could result in competition for forage with deer, elk, and antelope.
108P	Mogote Flat	Fall sheep grazing could result in competition for forage with antelope.
111P	Bighorn Creek	Spring and fall cattle grazing could result in competition for browse with deer and elk.
117P	Pinon	Spring, fall, and winter sheep grazing could result in competition for forage with deer and antelope.
124P	Pinon Hills	Fall and winter sheep grazing could result in competition for forage with antelope and deer.
133P	Tobin Creek	Fall and winter horse grazing could cause competition for browse with deer, elk, and and antelope.
141P	Zapata Falls	Spring and fall cattle grazing could cause competition for browse with deer and elk.

Endangered Species

No unavoidable impacts to threatened or endangered wildlife species are identifiable at this time. Future habitat inventories could reveal potential impacts on endangered species, and action would be taken to protect their critical habitats as required by the Endangered Species Act.

Aquatic and Riparian Communities

Silt resulting from construction and maintenance of range improvements, cattle paths, and truck trails would be deposited into streams, smothering unknown amounts of invertebrates plus fish and amphibian eggs. In-stream water collecting devices for water troughs would displace some natural cover for aquatic organisms. Physical damage to unfenced stream banks, vegetation, and substrate would occur from crowding livestock into smaller pastures in the grazing systems. These impacts would be expected to prevent riparian and aquatic communities from reaching optimum conditions. Complete destruction of the aquatic and riparian communities in the water gap areas would be unavoidable. Those springs that are developed for livestock water would lose a portion of their aquatic and riparian communities.

In addition, the aquatic and riparian communities in the pastures of the following allotments would show a degradation: Hat Springs Allotment (Hat Springs Creek, 1.8 miles) would show a rating reduced from "fair" to "poor"; Poison Gulch Allotment (Tuttle Creek, 0.5 miles) would show a rating reduced from "excellent" to "good"; Poncha Pass East Allotment (San Luis Creeks, 0.5 mile) would show a slight overall decrease, but the rating would remain unchanged; La Sauses, Rio Grande Common, and

Pinon Hills allotments (Rio Grande, 7 miles), which have a present rating of "poor," would show a continued degradation of areas not included in exclosures.

Land Use

Recreation

Although opening levers would be placed on gates, fences would continue to be obstacles to the users of NRL. Even with the gates being left open during winter on Poncha Pass West and Alder allotments, the fences (when not buried by at least one foot of snow) would be an obstacle and potential hazard to snowmobilers and sledders in that area.

Livestock Grazing

A total reduction in grazing of 373 AUMs on NRL would result from reduced or eliminated grazing on 44 management units. Minor reductions in livestock weight gains would be expected during the first 10 years of implementation.

Historical and Archaeological Resources

Although section 106 (historical and archaeological) clearance is required prior to the initiation of any surface disturbing activities, some unintentional damage and destruction of sites could still occur. Continued deterioration of six historical sites located on private lands within four management units would be unavoidable as a result of human vandalism and livestock rubbing against the structures.

Excavations resulting from pre-construction archaeological clearances would yield information that would have been lost otherwise. If, however, the excavation were not needed and the sites were left undisturbed, excavation could be postponed until more sophisticated methods and analytical equipment could be developed. Such postponement would result in the acquisition of more information per excavated site.

Pothunting damage from construction workers and NRL users who may take advantage of increased access resulting from the proposed action would go unmitigated.

Even with careful monitoring on erosion rates and with prompt stabilization action, it is very probable that some significant archaeological sites would be damaged or destroyed.

Aesthetics

Utilization of available opportunities for topographic and vegetative screening of proposed projects would reduce their potential visual impacts and the area of visibility. It would not, however, eliminate them.

Visual impacts of the proposed fencing projects specified in Chapter III for Poncha Pass West, Foothills, Zapata, and Mineral Hot Springs allotments would remain. Fencing exclosures to protect riparian vegetation on the Rio Grande as identified in Chapter IV would present additional discordant visual impacts.

Socio-Economic Conditions

Income

As noted in Chapter III, maintenance of improvements associated with the proposed action would place a burden on users (permittees) to the extent that these costs are proportionately greater than forage benefits obtained. The objectives of the proposal and estimated beneficial impacts include the generation of public good such as wildlife. Thus, the burden of maintenance costs, if borne primarily by livestock operators, would appear to be a misallocation of financial responsibility and therefore considered an adverse impact.

Several mitigating measures discussed in Chapter IV would involve improvements and costs not discussed or considered in the discussion of impacts (Chapter III).

In the La Sauses, Rio Grande Common, and Pinons Hills AMPs, nine 50' X 300' exclosures would be added. The net effect of these measures would be an additional 0.7 mile of fence, for an additional $1,400 in improvement costs. A possibility of some added exclosures in the future exists if trial efforts are successful in protecting or enhancing the growth of riparian vegetation.

In order to protect four historic sites on NRL, a total of 2,400 feet, or .45 mile of fencing, would be required. This measure would increase costs by another $900. It is also possible that a small amount of fencing might be needed in the future to protect archaeological sites if livestock grazing would cause deterioration and the sites were determined to have significant values. In view of the uncertainty associated with the future need, no cost estimate has been included.

On some spring developments it is possible that water use by livestock would dry up surface waters. In order to provide a continuing water source for small-game animals and birds, mitigation through the installation of guzzlers or sumps would be recommended. It is estimated that these added features would be required on 15 spring developments at a cost of $200 each for a total estimated cost of $3,000.

A summary of the added costs for the mitigating measures shows that the cost of the proposal would be increased by $5,300. Annual maintenance costs would be increased by an estimated $265 annually.

Socio-Cultural Attitudes

The imposition of more restrictive management practices by a governmental agency would conflict with local and self-deterministic values, thus generating an adverse impact on those affected.

Other Social Support Facilities and Services

Reduction in grazing qualifications, whether as a result of the elimination of grazing due to the unsuitability of the range resource or suspended non-use, would total 2,450 AUMs annually. This would translate into a reduction in carrying capacity of 204.17 animal units (one cow for one year). With a value of $1,000 in base property per animal unit of carrying capacity (associated with the loss of future income, related improvements, and so forth), the value of user's ranch property would decrease by an estimated $204,170. This would only be a theoretical or "paper" loss since current actual use is less than qualifications. On individual allotments where existing use is equal to qualifications and the proposed action would involve an actual reduction in use, the loss would be real.

While the overall impact would appear small, the adverse impact on individual operators could be substantial. A secondary adverse impact of this loss is the possible minor reduction of the regional tax base. Again, in view of existing actual use levels and possible future increases in use, the net effect of this is a theoretical and not a real adverse impact.

CHAPTER VI. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This chapter discusses productivity of the environment which would be affected by the implementation and operation of intensive management (AMPs) and elimination of grazing. Custodial management and continued unallotted status of range would entail no significant short- or long-term commitments of resources. The proposed action would be a long-term, reversible commitment of resources--water, soil, vegetation, and wildlife--that would require short-term commitment or trade-off of these resources.

Short-term refers to that period of time (20 to 30 years) during which most of the proposed action would be accomplished, and long-term refers to the time after complete implementation of the proposal when subsequent effects of the proposed action would still impact the environment.

Commitments of Resources

Short-Term

Range improvement construction would result in:

1. Loss of approximately 12,409 tons of soil
2. Removal of 512.5 acres of vegetation from production

Grazing management would result in:

1. Reduced vigor, reproduction, seedling establishment, and litter accumulation when pastures are grazed during the late spring

and summer and increased vigor, reproduction, seedling establishment, and litter accumulation when pastures are rested during the spring and summer or when grazing is eliminated.

2. Increases in competition between wildlife and livestock in the pasture when moderate to heavy grazing use is made
3. Reduced range-related income as a result of a 373 AUM reduction in allowable livestock use

Long-Term

Range improvement construction would result in:

1. Removal of 105 acres of vegetation from production
2. Possible destruction at spring sites of endemic populations of snails, amphipods, isopods, mites, fish, and plants
3. Shorter life of archaeological and historical sites through increased exposure to public use
4. Expenditure of 2.1 million dollars for range improvements (materials and labor)
5. Insignificant restrictions of movement of big game

Grazing management would result in:

1. A 3 to 5 percent increase in sediment yield on 50 AMPs with spring-summer grazing systems and a 10 percent decrease in the sediment yield on those AMPs with fall-winter grazing systems during the occurrence of a 50-year storm event
2. An annual soil loss of 318 tons occurring from the 150 miles of primitive roads
3. An increase in cool-season species along with 10 to 20 percent increase in ground cover and increases in vegetal production estimated at 34,075,800 lbs.
4. Increases in available forage for wildlife resulting in increased numbers of big game: 225 deer, 130 elk, 207 antelope, and 50 bighorn sheep
5. Increased diversity and productivity of all wildlife in the

valley as a result of improved ecological conditions throughout NRL

6. Stabilization of the riparian and aquatic communities
7. Increases in income ($30,260) from hunting expenditures and increases in income ($47,335) in livestock production
8. Potential increases in livestock production, 18,558 AUMs, from increases in vegetal production

CHAPTER VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This chapter identifies the irreversible and irretrievable commitment of resources resulting from the proposed action. The term irreversible is defined as use that is incapable of being reversed: once something is initiated, it would continue. The term irretrievable means irrecoverable: once something is used, it is not replaceable. The following paragraphs describe areas where these types of changes would be expected to occur.

The 104 acres which would be occupied by the range improvements would lose their capacity to produce vegetation for the life of the improvement. Except for the actual material destroyed or removed at the time of construction, none of the impacts on vegetation would be irreversible or irretrievable. Annual loss of forage for the areas removed from production would be approximately five tons for the life of the proposed projects. Loss of vegetative cover would cause soil movement or erosion which would be considered irretrievable within any reasonable time frame.

Springs developed for livestock water would partially or totally remove the water source upon which the riparian community depends. Often found in desert-like regions, these wet places contain remnant populations of plants and animals that were once widespread during wetter eras but have now been eliminated from a major portion of their range and are able to survive only in these small, relatively unchanged areas. These species are well-suited to spring micro-habitats, but are unable to withstand competition or major changes in their environment. As springs are developed and the spring head areas are changed, some of the organisms, especially molluscs and arthropods, would disappear forever (Taylor 1967, Minckley 1974).

Any excavation, damage, pot-hunting, or stripping done to any historical site or archaeological resource as a direct or indirect result of the implementation of the proposed action would be an irreversible and irretrievable commitment of these non-renewable resources.

The proposed action would involve the commitment of material associated with the proposed improvements listed in table III-13 (p.III-110). Once installed, these materials would basically be irretrievably committed, thought the materials might have some salvage value.

The major irreversible and irretrievable commitment would involve the costs associated with installation, maintenance, and administration of the proposal. Once the expenditures were made, those particular funds would not be available for other alternative public programs. An additional irretrievable commitment would involve the labor associated with the proposal. Labor, too, once expended could not be retrieved. Irretrievable losses of tax revenue would be realized where reductions in livestock use occurred.

CHAPTER VIII. ALTERNATIVES TO THE PROPOSED ACTION

This chapter presents seven alternatives to the Proposed Action. These alternatives include (A) No Action (no change in the present level of grazing management), (B) Elimination of Grazing (no grazing would be allowed on NRL in the San Luis Valley), (C) Custodial Management (grazing management reduced), (D) Reduced Management on Specific Allotments (type of management--whether an AMP, custodial, or elimination of grazing --would be determined by benefit-cost analysis), (E) Wildlife Effective (provides for optimum wildlife conditions), (F) Watershed Effective Management (provides for optimum watershed conditions), and (G) Balanced Multiple Use Management (a combination, selected by management unit from the alternatives and the Proposed Action, whichever would have the least adverse impacts).

The same 165 management units as identified in the Proposed Action (by name and number) would be considered in each of the alternatives. For comparison, impacts of all alternatives are projected to 2005, as was done in analyzing the Proposed Action.

The objectives of these alternatives vary individually from those of the Proposed Action and are described in each alternative.

Alternative A: No Action

Description

Alternative A, No Action, proposes no change in the present management. With this alternative, the Bureau's existing range management program and policies would be continued.

These programs and policies include adjustments in grazing levels as the need is identified through various activity plans (e.g., AMPs, habitat management plans, and watershed plans); continued implementation of one to two new AMPs annually (including the construction of associated range improvements); and trespass control through range use supervision.

This alternative would be similar to the Proposed Action in respect to the types of grazing systems--rest rotation, deferred rotation, etc.; the range improvement projects--fences, water developments, erosion control structures, etc.; and grazing administration (see figure I-2, in back cover pocket). The difference between this alternative and the Proposed Action is the implementation time schedule. The Proposed Action would be implemented over 8 years and the No Action alternative would be implemented over 45 years.

Discussion of the No Action alternative will be limited to the same time frame as the Proposed Action--2005, which is year 28 on the implementation schedule (table VIII-1).

With this alternative, the 10 existing AMPs would be continued and 52 new AMPs would be expected to be implemented on 382,424 acres of NRL by 2005. An additional 17 years would be required to complete implementation of AMPs on the remaining 33 units (91,492 acres NRL), which would have intensive grazing management. Management on these 33 units would continue as it is until implementation is completed in 2022.

TABLE VIII-1. SCHEDULE FOR IMPLEMENTING ALLOTMENT MANAGEMENT PLANS AND ELIMINATION OF GRAZING FOR NO ACTION ALTERNATIVE

Year 1	Year 2	Year 3	Year 4
1P Poncha Pass-West 137P Blanca (WHA) 74Eg Masonic Park	58P West Tracy Ridge 113P Llano 118Eg Mondragon*	46P Trickle Mountain 63P Biedell Creek 106P Little Mogotes	64P East of Carnero Creek 99P Cinder Pits 104Eg La Jara Canyon
Year 5	Year 6	Year 7	Year 8
57P Mitchell 97P Romero Canyon 105Eg Pastures*	98P Ra Jadero Canyon 127Eg Saddleback Mountain* 148Eg North Pasture	84P Rock Creek 134P Foothills 140Eg Park Pasture*	26Eg Garner Creek* 27Eg South 28P Cotton Creek
Year 9	Year 10	Year 11	Year 12
77P Bowen 80P Pup Peak	39P Findley Gulch 81P Limekiln	94P Jadero Flat 132P Four Mile	42P Poison Gulch 45P Cross Creek
Year 13	Year 14	Year 15	Year 16
48P Taylor Canyon 115P Alta Lake	102P La Jara Creek 110P Los Mogotes	50P Rabbit Canyon 112P Railroad	55P Mill Hill 125P Rio Grande Common
Year 17	Year 18	Year 19	Year 20
34P Mineral Hot Springs 126P La Sauses	56P Higgins Spring 88P Triangle	52P Hat Springs 133P Tobin Creek	60P Tracy Cattlemen's 138P Dry Lakes
Year 21	Year 22	Year 23	Year 24
86P Greenie Mountain 111P Big Horn Creek	83P Raton Creek 87P Gato-Hutchinson	16P East & West San Luis Creek	41P Laughlin Gulch 82P Nicomodes
Year 25	Year 26	Year 27	Year 28
108P Mogote Flat 129P Rio Grande	22P Piney Creek 24P Mirage	123P Eight Mile	124P Pinon Hills
▨ Year 29	▨ Year 30	▨ Year 31	▨ Year 32
47P Sheep Creek 96P Capulin	15P Nye 107P Grande	31P Hutchinson 120P Pinon	4P West Clover Creek 23P Steel Canyon
▨ Year 33	▨ Year 34	▨ Year 35	▨ Year 36
69P Elephant Rocks 70P Rio Grande Canal	36P McIntyre Gulch 95P Poso Creek	11P Kerber Creek	76P Sanderson 85P McMahon
▨ Year 37	▨ Year 38	▨ Year 39	▨ Year 40
93P Posito Creek 109P Poso	117P River 119P South Valley	65P Upper Coolbroth 73P Alder Creek	66P Lower Coolbroth 141P Zapata Falls
▨ Year 41	▨ Year 42	▨ Year 43	▨ Year 44
78P Schrader Creek 79P Branch	7P Alder 53P Robb Ranch	61P Tracy Individual 89P Alamosa River	59P Tracy Ridge 122P Braiden
▨ Year 45			
67P Carnero Creek 68P La Garita			

* Allotment would require fencing in order to eliminate grazing.

▨ Implementation of intensive management (AMPs) on these 33 management units would be completed between 2005 and 2022.

The elimination of grazing on nine management units, 5,930 acres NRL (see table VIII-1, p.VIII-3), would be implemented since these units are unsuitable for livestock grazing.

The custodial management of 39 units and the unallotted status of 22 units would be continued (see table I-2, (p.I-5 f.) for identification of these units) on 36,525 acres of NRL.

Soils

Implementation of 43 AMPs with spring or summer grazing (see table VIII-2) would result in little or no change in erosion rates except with the occurrence of a high-intensity storm--a 50 year storm event. With such a storm, 38 of the 43 AMPs (248,072 acres NRL) would have increased erosion rates because infiltration would have decreased with the concentration of livestock grazing during the spring or summer.

Erosion rates on the remaining 5 AMPs (14,140 acres NRL), despite spring or summer grazing, would remain essentially the same as they are now, even with the occurrence of a 50 year storm event. These allotments contain soils that are not susceptible to compaction by livestock because of their texture, which ranges from moderately coarse to very cobbly and stony.

Grazing during the fall and winter when the ground is frozen or semi-frozen has little or no effect on soil infiltration rates. With the expected increases in ground cover and no decreases in the infiltration rates, overland flow and sediment yields would decrease, resulting

TABLE VIII-2. SPRING-SUMMER GRAZED AMPs

Allotment Number and Name	Acres	Allotment Number and Name	Acres
1P Poncha Pass West	1,925	63P Biedell Creek	2,462
2E Arizona-Colorado	12,173	64P East of Carnero Creek	11,849
9E Turquoise Gulch	3,806	82P Nicomodes	3,080
10E Kelly Creek	6,699	83P Raton Creek	3,940
14E Noland Gulch	7,650	84P Rock Creek	12,680
16P East & West San Luis Creek	2,740	86P Greenie Mountain	8,114
22P Piney Creek	2,510	97P Romero Canyon	1,730
24P Mirage	2,395	98P Ra Jadero Canyon	6,730
25E Valley View Hot Springs	4,927	100E Ciscom Flats	3,680
28P Cotton Creek	3,880	102P La Jara Creek	820
34P Mineral Hot Springs	10,260	106P Little Mogotes	13,510
39P Findley Gulch	11,345	108P Mogote Flat	1,978
41P Laughlin Gulch	6,643	110P Los Mogotes	7,514
42P Poison Gulch	14,357	111P Big Horn Creek	760
45P Cross Creek	6,305	116E Twin Lakes	8,153
46P Trickle Mountain	19,562	121E Kiowa Hills	4,302
50P Rabbit Canyon	3,835	129P Rio Grande	2,975*
51E Saguache Park	1,920	132P Four Mile	320*
55P Mill Hill	4,167	134P Foothills	4,700*
56P Higgins Spring	753	137P Blanca	5,220*
58P West Tracy Ridge	925*	159E Klondyke	1,169
60P Tracy Cattlemen's	27,749		
		TOTAL	262,212

* Little or no change from the present hydrologic conditions is expected with implementation of spring-summer grazing management on these allotments due to increases in plant covers and/or the stony, cobble strewn soil associations. These total 14,140 acres.

in a reduction in erosion rates on the winter use AMPs (114,324 acres). Table VIII-3 shows AMPs grazed during the fall and winter.

The erosion rates on the 33 management units (table VIII-1, p.VIII-3) scheduled for AMP implementation from year 29 through year 45 are not expected to be changed from present levels by 2005 since livestock use would not be changed.

The erosion rates for the management units eliminated from grazing (5,930 acres) would also decrease. Erosion rates for the custodial and unallotted management units (36,525 acres) would remain unchanged since no change in the use of these units would occur with this alternative.

Change in erosion rates occurring in the resource area with this alternative would produce changes in soil productivity, but they would be difficult to measure.

As a result of increased ground cover throughout the resource area, movement of soil by wind would be reduced, but present information is inadequate to predict how much.

Increases in soil loss resulting from the construction of range improvements needed for implementation of intensive grazing management are estimated to be 10,347 tons. These increases would result from surface disturbances before the land could be stabilized.

TABLE VIII-3. FALL-WINTER GRAZED AMPs

Allotment Number and Name		Acres	Allotment Number and Name		Acres
48P	Taylor Canyon	2,902	112P	Railroad	3,741
52P	Hat Springs	4,564	113P	Llano	5,261
57P	Mitchell	938	115P	Alta Lake	11,446
77P	Bowen	488	123P	Eight Mile	5,640
80P	Pup Peak	5,002	124P	Pinon Hills	9,274
81P	Limekiln	5,050	125P	Rio Grande Common	18,611
87P	Gato-Hutchinson	1,960	126P	La Sauses	3,200
88P	Triangle	3,715	133P	Tobin Creek	6,126
94P	Jadero Flats	5,200	138P	Dry Lakes	5,836
99P	Cinder Pits	15,370			
				TOTAL	114,324

Water

Little or no alteration of the present hydrologic regime would occur either locally or basin-wide. By 2005, 43 spring-summer-grazed allotments would be under grazing management (see table VIII-2, p.VIII-5). Watersheds located in 38 of the 43 AMPs with spring-summer grazing periods would experience increases in rill and channel erosion due to increase in storm runoff and peak discharges associated with large, intense 50-year or greater storm events. Five of these 43 AMPs would have no change in their hydrologic responses.

The sediment yield from the spring-summer grazing units under this alternative would be 146,063 to 148,899 tons per year, or an increase of 4,250 to 7,090 tons. Decreases in sediment yield would be expected to occur on the 19 AMPs with fall-winter grazing (see table VIII-3, p.VIII-7). The decreases in sediment yield on these management units would be 10 percent, or 7,860 tons per year. This reduced sediment yield would occur on 114,224 acres of NRL.

Those AMPs which would not be implemented until after 2005 would have sediment yields unchanged from the present sediment yields (0.3 to 1.1 tons per acre).

The sediment yields on the nine management units in which grazing would be eliminated would be expected to decrease, but by how much is not known. Sediment yields on the unallotted and custodial management units are expected to remain unchanged from present levels.

Water quality of the large river systems in the valley would not be affected from the No Action alternative.

Vegetation

Since the schedule of implementation for AMPs with this alternative would be nearly six times that of the Proposed Action--8 years versus 45 years--the vegetative responses (by 2005) expected with implementation of this alternative would be as follows:

1. Twenty-five (25) AMPs (10 existing AMPs) would have the same effects on vegetation--increased ground cover, more cool season plant species, increased vegetal production, and an improvement in range condition--as the Proposed Action since these AMPs would have been implemented for at least 20 years (time estimated for long term impacts on vegetation to become apparent --year 8 of the implementation schedule would be the latest that an AMP could be implemented). See table VIII-1 (p.VIII-3) for implementation schedule.

2. Thirty-seven (37) AMPs have effects similar to those of the Proposed Action on vegetation, but the degree of these effects would be less since these AMPs would not have been implemented long enough to realize the long term impacts on vegetation.

3. Thirty-three (33) AMPs would not be implemented by 2005, thus there would be no measurable changes in the vegetation from the present condition since further deterioration of the range would not be expected.

4. Elimination of grazing, custodial management, and continued unallotted status would have the same impacts on vegetation with this alternative as the Proposed Action.

Thus, the expected range condition (by 2005) with this alternative would be 163,567 acres of NRL in good condition, 212,959 acres of NRL in fair condition, and 139,845 acres of NRL in poor condition.

Those impacts resulting from construction of improvements would be spread out over a longer period of time, according to the implementation schedule. Impacts in any one area at a given time would be less, since improvements for only two to five AMPs would be in progress during any one year. Total acres of short-term disturbance due to improvements would be approximately 380 ares, with 73 acres removed from production for the life of the projects.

An estimated five tons of forage annually would no longer be available from these 72.6 acres. This would be insignificant compared with 31,163 tons of forage used each year by livestock.

Wildlife

This alternative is based on the assumption that existing significant grazing-related wildlife problems as described in Chapter II would eventually be corrected by implementation of AMPs wherever feasible. However, the period required to complete implementation would be many times greater (approximately 45 years) than the eight years required in the Proposed Action.

The ultimate level of wildlife food and cover made available on NRL under this alternative would be similar to the level of the Proposed Action. However, because of the extended period necessary to achieve intensive livestock management on many allotments, the populations of most large herbivouous game animals would not increase as rapidly as with the Proposed Action.

Table VIII-4 lists the projected populations of big-game herds in the year 2005 for Alternative A. With the exception of bighorn sheep, losses of habitat and productivity due to factors unrelated to this alternative (e.g., subdivisions on private land and other conflicting human uses) would offset gains due to improved habitat conditions on NRL. At best, this alternative would result in stable populations of deer, elk, and antelope.

Forage and population increases for the Trickle Mountain bighorn sheep herd would be similar to those expected with the Proposed Action. An increase of about 50 bighorns would result in significant increases in hunting opportunity and economic return. The Trickle Mountain area has an established high priority for implementation of AMPs because of its high wildlife values, and AMPs would be implemented in the near future under present management.

TABLE VIII-4. PROJECTED CUMULATIVE IMPACTS OF ALTERNATIVE A,
NO CHANGE (NO ACTION),
ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA BY 2005

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL		
			Change		Population after Change
			%	No.	
Mule Deer	4,500	+20%	None	0	4,500
Elk	2,600	+20%	None	0	2,600
Antelope	1,145	+25%	None	0	1,145
Bighorn Sheep	250	+30%	+20%	50	300

* The maximum estimated population to use NRL at least part of each year

** Forage provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

Endangered Species

The anticipated impacts of this alternative on endangered species would be similar to those of the Proposed Action. No significant impacts are expected.

Aquatic and Riparian Communities

The overall result of maintaining the existing policy of range management would be at first a decline and eventually an improvement and stabilization at about the present level.

Land Use

Recreation

The impacts on recreation described for the Proposed Action would also occur if this alternative were selected.

Livestock Grazing

Table VIII-5 shows present use, proposed use at the time of implementation, and projected forage availability in 2005. The following assumptions were applied in development of the data shown in table VIII-5: (1) non-use would continue either until implementation of an AMP or through 2005; (2) for existing AMPs, implementation has already occurred and projected availability would achieve the levels indicated in table III-9 (p.III-89 f.); (3) unallotted tracts would retain their unallotted status; (4) custodial use would be implemented by management action during the first three years of the analysis period; (5) for proposed AMPs that would be implemented, current use levels would continue until implementation, at which time proposed use levels as shown in table III-9 would apply. After implementation, forage availability would increase over a 20-year period in a linear fashion until future productivity levels as shown in table III-9 are achieved. When implementation is too late to allow the full 20-year response period to occur, a fractional increase

TABLE VIII-5. LIVESTOCK GRAZING ANALYSIS; ALTERNATIVE A (NO ACTION)

Allotment Number and Name	Present Use AUMs	Proposed Use (Upon AMP Implementation) AUMs	Projected Availability (in 2005) AUMs	Allotment Number and Name	Present Use AUMs	Proposed Use (Upon AMP Implementation) AUMs	Projected Availability (in 2005) AUMs
1P Poncha Pass West	555	375	500	41P Laughlin Gulch	453	453	522
2E Poncha Pass-East &	380	380	534	42P Poison Gulch	884	955	1,391
East Side	1,875	1,875	2,466	43C Ward Fenced Tracts	18	18	18
3C Round Hill	10	10	10	44C Indian Creek	7	7	7
4P West Clover Creek	57	**	57	45P Cross Creek	300	301	580
5C Clover Creek	5	5	5	46P Trickle Mountain	1,195	776	1,800
6C San Luis Creek #1	5	5	5	47P Sheep Creek	210	**	151
7P Alder	133	**	133	48P Taylor Canyon	245	245	301
8C San Luis Creek #2	12	12	12	49C Meadow Fenced F.R.	20	20	20
9E Turquoise Gulch	539	539	960	50P Rabbit Canyon	289	292	330
10E Kelly Creek	566	566	900	51E Saguache Park (USFS-BLM)	119	119	200
11P Kerber Creek	274	**	274	52P Hat Springs	323	323	362
12C South Kerber Creek	12	12	12	53P Robb Ranch	113	**	113
13C North Kerber Creek	18	18	18	54C Mesa	20	20	20
14E Noland Gulch	541	541	636	55P Mill Hill	263	263	351
15P Nye	90	**	90	56P Higgins Spring	49	49	65
16P East & West San Luis	272	262	302	57P Mitchell	51	8*	80
Creek				58P West Tracy Ridge	50	16*	60
17C Section 35 Tract	18	20	20	59P Tracy Ridge	44	**	44
18C Junction	20	20	20	60P Tracy Cattlemen's	2,842	2,847	3,048
19C Section 13 Tract	12	12	12	61P Tracy Individual	99	**	99
20U Unallotted	--	--	--	62U Unallotted	--	--	--
21C Silver Creek F.R.	8	8	8	63P Biedell Creek	172	172	250
22P Piney Creek	180	171	174	64P East of Carnero Creek	620	630	1,200
23P Steel Canyon	210	**	210	65P Upper Coolbroth	118	**	118
24P Mirage	187	187	198	66P Lower Coolbroth	58	**	58
25E Valley View Hot	427	427	600	67P Carnero Creek	Non-use	**	Non-use
Springs				68P La Garita	Non-use	**	Non-use
26Eg Garner Creek)				69P Elephant Rocks	200	**	200
27Eg South)	30	None	None	70P Rio Grande Canal	Non-use	**	Non-use
28P Cotton Creek	312	312	550	71C Indian Head	28	28	28
29C Noland Gulch	45	45	45	72C County Line	18	18	18
30C South Kerber Creek	12	12	12	73P Alder Creek	20	**	20
31P Hutchinson	79	**	79	74Eg Masonic Park	22	None	None
32U Unallotted	--	--	--	75C Show Creek	44	44	44
33U Unallotted	--	--	--	76P Sanderson	32	**	32
34P Mineral Hot Springs	744	1,030	1,261	77P Bowen	32	21	49
35U Unallotted	--	--	--	78P Schrader Creek	Non-use	**	Non-use
36P McIntyre Gulch	311	**	311	79P Branch	Non-use	**	Non-use
37U Unallotted	--	--	--	80P Pup Peak	404	404	495
38U Unallotted	--	--	--	81P Limekiln	370	370	487
39P Findley Gulch	1,127	753	1,020	82P Nicomodes	303	304	311
40C Calvert Fenced F.R.	14	14	14	83P Raton Creek	384	387	403

* Denotes average annual use where yearly variation occurs

** Proposed AMP would not be implemented prior to or during 2005
Present use would continue

TABLE VIII-5. LIVESTOCK GRAZING ANALYSIS; ALTERNATIVE A (NO ACTION) (cont.)

Allotment Number and Name	Present Use AUMs	Proposed Use (Upon AMP Implementation) AUMs	Projected Availability (in 2005) AUMs	Allotment Number and Name	Present Use AUMs	Proposed Use (Upon AMP Implementation) AUMs	Projected Availability (in 2005) AUMs
84P Rock Creek	1,147	1,147	1,440	126P La Sauses	141	128	201
85P McMahon	1,310	**	1,310	127Eg Saddleback Mountain	32	None	None
86P Greenie Mountain	128	598	634	128C Oxbow	8	8	8
87P Gato-hutchinson	228	228	241	129P Rio Grande	103	98	128
88P Triangle	315	210*	315	130C Allotment B	3	3	3
89P Alamosa River	40	**	40	131U Emperius	--	--	---
90C Alamosa Prairie	11	11	11	132P Four Mile	Non-use	18	28
91U Unallotted	--	--	--	133P Tobin Creek	235	235	399
92C Chicago Bogs	52	52	52	134P Foothills	279	257	500
93P Posito Creek	218	**	218	135C Dow Pasture	14	14	14
94P Jadero Flat	323	322	541	136C Phiffer Pasture	4	4	4
95P Poso Creek	206	**	206	137P Blanca Allotment	36	48	530
96P Capulin	587	**	587	138P Dry Lakes	139	139	315
97P Romero Canyon	114	127	200	139C Caldwell Pasture	13	13	13
98P Ra Jadero Canyon	711	621	800	140Eg Park Pasture	12	None	None
99P Cinder Pits	1,179	1,160	1,850	141P Zapata Falls	244	**	284
100E Ciscom Flat	192	192	400	142C Bachelor Lake	24	24	24
101U Hot Creek	--	--	--	143C Spring Pasture	10	10	10
102P La Jara Creek	Non-use	30*	51	144C Sand Pasture	10	10	10
103C Del Rancho	12	12	12	145C Crow Pasture	40	40	40
104Eg La Jara Canyon	18	None	None	146C Section 15 Lease	8	8	8
105Eg Pastures	21	None	None	147C Section 15 Lease	7	7	7
106P Little Mogotes	1,169	1,444	1.700	148Eg North Pasture	40	None	None
107P Grande	443	**	443				
108P Mogote Flat	206	206	217	149U Unallotted	--	--	--
109P Poso	315	**	315	150C Dry Lakes	4	4	4
110P Los Mogotes	507	652	756	151U Unallotted	--	--	--
111P Big Horn (Creek)	90	59*	73	152U Unallotted	--	--	--
112P Railroad	210	159	316	153U Unallotted	--	--	--
113P Llano	187	150	500	154U Unallotted	--	--	--
114U Unallotted	--	--	--	155U Unallotted	--	--	--
115P Alta Lake	711	575	1,106	156U Unallotted	--	--	--
116E Twin Lakes	653	653	900	157U Unallotted	--	--	--
117P River	200	**	200	158U Unallotted	--	--	--
118Eg Mondragon Individual	4	None	None	159E Klondyke (USFS-BLM)	47	47	120
119P South Valley	139	**	139	160C Phone Line	24	24	24
120P Pinon	392	**	392	161C Big East	40	40	40
121E Kiowa Hill	208	208	430	162C Hellgate	29	29	29
122P Braiden	60	**	60	163C Sheep Trail	11	11	11
123P Eight Mile	238	212	227	164U Terrace Lakes	--	--	--
124P Pinon Hills	538	391	381	165U Bonanza	--	--	--
125P Rio Grande Common	860	838	1,265				
				TOTALS	34,999	34,379	46,138

was calculated and included in the Projected Availability column of table VIII-5 (p.VIII-13 f.).

In summary, licensed use would start from the present base of 34,999 AUMs annually. As AMPs and eliminations were implemented, use levels on specific management units would change to those levels shown in the "Proposed Use" column of table VIII-5. By 2005, projected availability of forage would increase to a total of 45,874 AUMs annually. Here, as in the Proposed Action, no commitment is made to allocate increases over implementation levels.

Thus, an increase in projected availability of forage for domestic livestock of 11,139 AUMs would occur. Adding to this, the estimated 2,000 AUMs of licensed use not actually used would yield a net increase in actual availability of 13,139 AUMs. The use character of the range would remain essentially constant, with discrete changes (improvements, etc.) barely noticeable over the analysis period.

Archaeological Resources

The impacts on archaeological resources described for the proposed action would also occur if this alternative were selected.

Historical Resources

This alternative would have no effect on historical values other than to leave the sites in question in their present condition. There would be further deterioration and weathering along with some livestock damage.

Aesthetics

With the implementation of AMPs and the construction of range improvements, visual impacts identical to those described for the Proposed Action would be less with Alternative A, since 33 fewer AMPs would have been implemented by 2005.

Socio-Economic Conditions

Population

The magnitude of the increase in annual use levels is insufficient to influence ongoing population trends. The proposal would have a slight stabilizing effect

Income

Range Livestock Related Income

By the end of the analysis period, forage availability would be increased by 11,139 AUMs annually, with actual available use increased by 13,139 AUMs annually. In the former case, the total range livestock related income impact would be an increase of $17,377 annually (11,139 X $1.56 = $17,376.84 X 1.535 (livestock income multiplier) = $26,673.45). The estimated actual total range livestock income would be $31,463 annually in 1970 dollars (13,139 X $1.56 X 1.535 = $31,462.65).

Construction-Related Income

Over the period of consideration, a total of $1,331,885 (in 1976 dollars) would be expended on improvements associated with the implementation of the 52 AMPs and the elimination of grazing on 9 allotments. If 20 percent of the total construction costs were retained by region households, the total income effect would be $266,327. Annual maintenance costs would be about $61,444 by 2005. Due to the slower rate of implementation, the income effect of maintenance would rise from zero to about $18,433 annually in 2005.

Considering the length of the period over which the improvements would be constructed, locally this income effect would be relatively small and regionally imperceptible.

As with the Proposed Action, the impacts with this alternative would be positive to the extent that a small amount of additional income would be generated for farmhands and construction laborers. Impacts on users would be negative to the extent that maintenance costs would exceed the value of AUMs generated.

Recreation-Related Income

In the far future, improved habitat for big-game populations would be expected, and eventual realization of added income from big-game hunting could be expected.

By 2005, the only big-game species expected to increase would be bighorn sheep. A 17 percent increase of the present herd would generate an estimated increase in expenditures by sportsmen of $786, increasing local income only about $160 annually.

Other Income Effects

Under this alternative, BLM would hire four additional employees over the implementation period to supervise the installation of improvements, assist with maintenance, and assist with grazing system management. One or two employees might not be hired until partial implementation is achieved. Annual salaries for all four employees would total an estimated $50,000 annually by 2005.

Employment

As with the Proposed Action, Alternative A would generate an estimated 22 man-years* of construction employment during the implementation phase. Government employment would increase by four positions by the end of the analysis period. Recreation and maintenance related employment would probably not generate additional employment due to the smaller impacts and long-term realization of those impacts.

Social Well-being

The well-being of the region's populace would not be changed by this alternative.

Socio-Cultural Attitudes

The length of time planned for implementation of this proposal would permit more discussion and, hopefully, greater acceptance of its consequences and implications. In addition the results of further discussion could be integrated into or used to alter the proposal.

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* Assumes an average salary of $12,000

The alternative is in harmony with existing attitudes and values that favor stabilization and improvement of existing resources. The conflict between an "imposed plan" and self-determined values would be diminished, although some minor conflicts would occur.

Other Social Support Facilities and Services

In the short run, livestock use levels would remain about constant, with some reductions imposed on allotments where the range condition is still declining. Slower improvement of the range resource and facilities would delay realization of Proposed Action use levels. In the end, most of the 2,450 AUMs of grazing reductions would be implemented. (If fully implemented, Alternative A would introduce a theoretical decrease in value of lease property and related facilities of $204,170.) Since most of these reductions do not reflect net actual decreases, the impact would be insignificant.

Since the long-term effect would be an increase in both actual use and projected forage availability, the net effects on social support facilities and services would be positive but regionally imperceptible. The increase in forage (11,139 AUMs) availability translates into 928.25 animal units and an estimated increase in base property values of $928,250 (a net increase of $724,080). Total regional assessed valuation would increase by $278,475, only a 0.14 percent increase over the current base. The net effect on the regional tax base would be an increase of $217,224.

Alternative B: Elimination of Domestic Livestock Grazing

Description

Alternative B would eliminate domestic livestock grazing on NRL in the San Luis Resource Area. Trespass control would be enforced through extensive boundary fencing to separate NRL from State and private lands. Approximately 500 miles of fencing would be required. Some private landowners could be anticipated to close their lands to the public, which could limit public access to NRL.

Soils

Construction of the 500 miles of fence necessary to implement this alternative would result in approximately eight tons of soil loss per mile of fence. This would be an annual loss until the vegetation recovers. Recovery rates would range from three to ten years depending on annual precipitation (see table III-1 (p.III-3) for recovery rates). Approximately 4,000 tons of soil loss would occur annually, or from a minimum of 12,000 tons to a maximum of 50,000 tons total.

Water

Elimination of grazing would have the following general impacts on hydrologic processes and factors: (1) precipitation would be detained longer by improved plant cover; (2) evaporative interception losses, although slight, would increase proportionately with plant cover; (3) infiltration rates would slowly approach those intrinsic to the soil type without grazing use; (4) overland flow velocities and quantities would be reduced, especially those associated with moderate to heavy rainfall; (5) storm runoff volumes and peak discharge would be lowered; (6) channel stability in second-, third-, and fourth-order channels would improve as scour and bank erosion decrease in frequency and magnitude; (7) soil water recharge opportunity would be increased, and as plant cover increased, such moisture would become increasingly available for plant transpiration; (8) unit sediment discharges should decrease, as should potential maximum sediment transport capacities; (9) year-to-year climatic fluctuations would begin to exert less and less control over the water yield of subject allotments; (10) fewer runoff events would occur over the long term. Several of the above impacts could take two to five years to become evident and/or measurable.

With the elimination of grazing, the decrease in sediment yield would be 5 to 10 percent from the present situation on all allotments. The sediment yield would decrease from the present yield of 302,122 tons per year to 287,016 to 271,909 tons per year. Water quality would be improved.

Vegetation

Complete elimination of grazing on NRL would result in a change in composition of vegetative cover. It can be assumed that "natural" succession would result in a climax plant community over a period of years, probably many years. Grass would be favored on most sites, especially on allotments formerly grazed with cattle or horses. Litter would accumulate. Wildfires might become more prevalent as a result of fuel accumulation. Additional federal funds might be required to control wildfire, prevent trespass by livestock, and rehabilitate burn sites. Soil nutrients used by the plants would be retained on site for the most part.

Improvement of range condition would be greatest on those areas now grazed during the spring, summer, or early fall. However, this would be slow, especially where significant soil erosion has occurred. The expected range condition (2005) with this alternative would be 175,566 acres of NRL in good condition, 180,730 acres of NRL in fair condition, and 160,385 acres of NRL in poor condition.

The required boundary fences would temporarily remove from production approximately 250 acres of vegetation; approximately 50 acres would be permanently removed from production.

Wildlife

Total elimination of livestock grazing would also eliminate any possible competition between big game and livestock for forage. Increases in the amount of forage which big game could utilize would depend on the existing competition levels between livestock and big game and other limiting habitat components of the total range of the herds. Winter forage is generally thought to be the limiting factor on most Colorado big-game herds, but unlimited winter forage would not result in unlimited herds because other habitat components would limit them.

Total elimination of grazing is often not the answer for optimum wildlife production. Anderson and Scherzinger (1975) discuss a prime elk winter range in Oregon in which cattle grazing was used as a tool to dramatically increase usable elk forage. Average elk counts increased from 120 with unplanned grazing to 320 when grazing was eliminated, and to 1,200 after several years under a management system designed to improve the succulence and nutritive value of winter elk forage. The range condition also improved noticeably during this period, and AUMs of cattle grazing were increased by 2.6 times.

Management experience with antelope also indicates that elimination of livestock grazing is not always desirable. Grazing by domestic animals was prohibited as a restoration measure on the Hart Mountain Antelope Refuge in Oregon, but it soon became apparent that controlled grazing by domestic animals was advisable to reduce the range fire hazard even though three- to four-thousand antelope were using the range (Einarsen 1948).

Hill (1956) states that improvement of mule deer winter range on public lands would "not necessarily require elimination of all livestock grazing because moderate use by cattle may help to hold a favorable balance between shrubs and grasses." However, Hill (1956) also believes that for the small amount of land that is critical deer range livestock use should be curtailed or eliminated if necessary.

Table VIII-6 shows the projected cumulative impacts of the alternative to eliminate livestock grazing on big-game populations in the San Luis Resource Area by the year 2005. Some increases in population would be expected for each species during the first few years following

TABLE VIII-6. PROJECTED CUMULATIVE IMPACTS OF ALTERNATIVE B, ELIMINATION OF DOMESTIC LIVESTOCK GRAZING, ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA BY 2005

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL	
			Change	Population after Change
Mule Deer	4,500	+10%	None	4,500
Elk	2,600	+10%	None	2,600
Antelope	1,145	+15%	+5%	1,202
Bighorn Sheep	250	+10%	None	250

* The maximum estimated population to use NRL at least part of each year

** Forage provided by NRL

SOURCE: Colorado Division of Wildlife Big Game Harvest Statistics and estimates by CDW and BLM personnel.

elimination of grazing, but these increases would be offset later by losses of habitat to factors unrelated to grazing on NRL such as subdivisions on private lands and other conflicting human uses. These losses of usable big-game habitat would decrease the overall carrying capacity of the total big-game range to which NRL contribute, and the big-game populations using NRL in the year 2005 would reflect the overall carrying capacity.

The volume of forage available to mule deer, elk, and bighorn sheep would be expected to increase by not more than 10 percent, since the present level of competition is not believed to exceed this amount. However, populations of these species would not be expected to increase since the increases in forage volume would be offset by comparable or perhaps greater losses in carrying capacity, due to losses of habitat to conflicting human uses not related to grazing. The tendency of vegetative composition to increase in grasses at the expense of shrubs on ungrazed deer winter ranges would also detract from the carrying capacity of the ranges.

A 5 percent increase in antelope numbers would be expected as a result of a 15 percent increase in forage for antelope. This would result in minor increases in antelope hunting opportunity and related economic return for residents.

The elimination of grazing would also remove other desirable effects of grazing management. Water sources which have been developed for livestock would no longer be operated and maintained by the livestock allottee. Most would be lost as sources of wildlife water unless wildlife funding and personnel were available to operate and maintain them. This funding and personnel would not be expected given current levels of funding.

The 500 miles of fencing would create a considerable overall impediment to movements of big-game animals. The impact of extensive fencing could prove to be environmentally unacceptable. BLM fencing specifications would lessen this impact somewhat if they were followed, but some or all of the fencing could be privately constructed on private-land boundaries. Additional federal expenditures would be required to prevent livestock trespass.

Wildlife populations would not be expected to increase significantly if grazing were eliminated since grazing is not believed to be depriving these animals of important habitat components.

Endangered Species

Since elimination of grazing would also eliminate any possible conflict between livestock and the prairie dogs whose towns provide potential black-footed ferret habitat, no adverse impacts on endangered species would be expected from this alternative.

Aquatic and Riparian Communities

The riparian habitat would be expected to improve dramatically by the elimination of grazing. Without livestock grazing, improvements on those stream reaches classified as "fair" and "good" would begin immediately. By 2005, 70 percent of the riparian habitat in the valley would be classed as "excellent." The 28.5 percent of riparian habitat classified as "poor" would be stabilized with herbaceous plants, and woody plants would begin to establish themselves. Those that are in poor condition would then improve to an expected "good" classification within 30 years.

Livestock in trespass would limit improvement on portions of streams since riparian areas would be grazed first. It is difficult to assess the impact of infrequent trespass on riparian habitat, but it is expected to be minimal. Improved watershed conditions would buffer water flow during high- and low-flow periods and extend the riparian vegetation further onto the alluvial fans. This would increase the habitat for riparian-associated mammals, e.g., birds, invertebrates, and reptiles.

The aquatic community would also show improvements corresponding to the riparian increases. Fish populations would be expected to increase as a result of lower water temperature (increased shade from increased riparian vegetation along stream banks) and improved water quality. The amount of increase in fish population cannot presently be predicted.

Land Use

Recreation Resources

Improved water quality would improve the aquatic habitat for game species of fish. This would increase the quality of the small fishing resource found on NRL in the San Luis Valley. Even with the on-site and downstream effects of the improved water quality, a significant increase in fishing use would be doubtful.

The existing antelope herd would increase by 5 percent; however, the impact on hunting opportunities would be negligible.

The anticipated improvement in range condition and reduction in soil erosion implies that the NRL would be better able to withstand the impacts of off-road vehicle use and other dispersed recreation activities. Additional boundary fencing, however, would restrict the movement of recreation users more than at present. Mitigation could be the same as for the fencing in the Proposed Action if the federal government were to construct the fences.

The loss of public access to NRL because of closure of existing quasi-public access could result in concentration of recreation use in the remaining accessible NRL. Since present use levels are low, thee immediate impact would be small. Future use levels could be significantly higher than present ones. Concentration of users would then be noticeable and have a detrimental effect on the available recreation experiences. Acquisition of public access through lands that would be closed would mitigate that particular impact.

The nuisance factor of the additional fencing would remain as the sole unavoidable adverse impact. Limitations on funding and delays in acquiring public access easements could also result in an unavoidable adverse impact.

Livestock Grazing

With the implementation of the elimination of livestock, use of NRL would likely consist of recreational pursuits, including big-game hunting. The character of the lands would become essentially natural or wild, but the lands would not revert to their true historic character.

Domestic livestock use totaling about 33,000 AUMs per year would be lost, forcing area operators to reduce their herds by about 2,750 animal units (33,000 divided by 12 = 2,750), or about 2 percent of the estimated 1974 livestock inventory. While this reduction appears relatively insignificant region-wide, it would come at a time when the demand for AUMs is expected to increase and thus either force increased production in other areas or reduce the per capita red meat supply.

Archaeological Resources

Less intensive soil erosion would imply that related loss of archaeological values would be slower than at present. Closure of quasi-public access routes to NRL would result in the protection of archaeological resources from most amateur collectors and pothunters. Site investigation would not be necessary for either livestock grazing or its essential support measures.

Impacts, mitigation, residual impacts, and irreversible resource commitments with fence construction would be the same as those for the proposed action.

Historical Resources

Alternative B would provide better protection for historical properties because livestock damage would be greatly reduced and public access would be limited. The sites in question would then be better protected from human vandalism and livestock damage but would still be subject to natural deterioration through aging and weathering.

Aesthetics

The boundary fencing would have little visual impact where fencing already exists and is considered to be an acceptable part of the landscape. The location would mainly be in the pastoral setting of the valley floor and in the alluvial fans of the Sangre de Cristo Mountains and the low foothills in the western and southern parts of the San Luis Valley. Detrimental impacts could be expected to occur when the fences are located in more sensitive settings such as the unfenced portions of the Rio Grande National Forest boundary.

Socio-Economic Conditions

Population

If Alternative B were implemented, there would be a slight negative impact on San Luis Valley population levels as the number of livestock ranchers decreased following implementation. Since a recombination of ranch properties would likely result, all allottees would not be forced out of business. However, some of them would be forced out, with the net effect being a loss of some of the valley's economic base and a slight downward pressure on the region's population.

Income

Range Livestock Related Income

Income from livestock ranching would be reduced by about $79,022 annually (33,000 X $1.56 = $51,480 X 1.535 = $79,021.80), including both the direct and indirect effects. This loss represents a 3 percent decrease in range livestock related income and a 0.13 percent decrease in total region income. While the adverse impacts region-wide would appear insignificant, the impacts on the allottees would be much more severe, forcing a series of sales and recombinations of ranch property as some operators sold their base properties and migrated to cities within the region or left the region entirely.

Contract Construction Related Income

Since extensive boundary fencing would be required to keep domestic livestock off NRL, there would be some positive short-term impacts on this sector. While the exact fencing requirement is unknown, it is believed that at least 500 miles of fencing would be required to fence NRL from private lands. This amount of fencing would cost an estimated $1,000,000 with annual maintenance costs totaling about $20,000..

The income effects of construction would total about $200,000 with annual maintenance income effects of $6,000. Since many existing improvements would not be maintained, some loss of income could be expected.

Recreation-Related Income

Under this alternative, the antelope population would increase by 5 percent. This increase would generate increased expenditures of $132.20 ($2,644 X 0.05 = $132.20) and increase region incomes by about $26.44 ($132.20 X 0.20 = $26.44). This minute positive impact, when combined with the anticipated closure of private lands and construction of non-wildlife type fencing by private operators and other limiting factors, suggests a small negative recreation-related income effect.

Other Income Effects

With the elimination of domestic livestock grazing, it would be likely that one existing BLM and one additional position would be directed toward a land exchange program in order to avoid the need to fence small scattered tracts of NRL and allow private owners to exchange isolated parcels of their lands for parcels adjacent to their major holdings.

Thus a "blocking up" of NRL would occur, generating income of about $15,000 annually.

Employment

During construction of fencing, about 17 man-years of employment would be generated. Maintenance efforts would likely generate employment for one or two persons on a part-time or seasonal basis. The land exchange program would also generate employment for one additional person for a period of five to ten years.

In summary, the fencing impacts would be a once-only impact, with medium-term employment impacts resulting in two or three more jobs per year, eventually tapering off to part-time maintenance employment. Combining these positive impacts with the expected reduction in the number of ranch operators and ranch hands indicates a net adverse impact. Regionally, the impact would be small, but affected individuals would experience major adverse impacts and hardship.

Social Well-being

This alternative would have a slight adverse impact on the San Luis Valley region. Major adverse impacts would be felt by those operators who could not survive the imposed changes in their operations and life styles, which would probably drive them to the urban centers in the valley or from the valley.

Socio-Cultural Attitudes

The elimination of livestock grazing would conflict with local self-deterministic values and attitudes. Considerable resentment and antagonism could be expected.

Since the action would conflict with local attitudes and values regarding economic growth and would not generate a substantial change in resource values, the local public reaction would be strong.

Undoubtedly, several national-regional interest groups would enter the picture, generating debate about the advisability of this alternative. With considerable emotion, the groups would likely call for a political resolution of the issues involved.

Other Social Support Facilities and Services

The collective socio-economic impacts of this alternative, if implemented, would be adverse. However, the magnitude of these impacts regionally would be small. It is therefore doubtful that existing schools, hospitals, and so forth would be forced to close or that any loss of services would occur.

The loss of grazing qualifications would total almost 37,000 AUMs, or 3,083 animal units annually (37,000 animal unit months/12). Thus users would experience a theoretical reduction in property values of about $3,083,000. Actual use would decrease by about 33,000 AUMs, or 2,750 animal units annually. Thus the loss in income foregone and other improvements no longer of value would actually be closer to $2,750,000.

The tax base would be reduced by $825,000, representing a decline of

0.45 percent. While the regional tax base would be adversely affected, the impact would be small. The loss in property value by affected users would be a major adverse impact on them and would reduce their financial well-being, adversely affecting the socio-economic well-being of the region. The increased fire danger, resulting from increased natural vegetation and dry litter accumulation, would impose an additional burden on local fire departments and increase BLM fire expenditures. Since the exact future fire frequency and seriousness is unknown, no specific dollar estimate will be made.

Alternative C: Custodial Management of Grazing

Description

With this alternative, term permits for periods up to ten years would be issued. On management units where NRL is consolidated and/or has identifiable resource values (e.g., wildlife and watershed), the permit would specify the class of livestock, the number of livestock allowed, and the season of use. Where small tracts of NRL are surrounded by private lands and have little or no resource values, the permit would specify only the allowable AUMs. At implementation, grazing use would be 31,460 AUMs.

Assumptions made in developing these allotment specific estimates include the following:

1. All non-use would be continued as non-use.
2. Use levels for custodial management units as identified in the proposed action table I-2 (pp.I-5 f.) would not change with this alternative.
3. All eliminations as shown in table I-2 would be affected.
4. Allotments with existing AMPs would achieve projected availability levels as identified in table III-9 (pp.III-89 f.). This assumption is based on the observation that existing AMPs were developed generally for livestock operators who believe in the application of more intensive management principles and who are also already achieving beneficial effects from their grazing plans. Thus, there is no reason to believe that these operators would abandon management systems that are successful. However, BLM would not be committed to the continuation of the existing allotment management plans and range-related studies and no new AMPs, range improvements or range studies would be developed. Range use supervision would be limited to trespass control in accordance with the federal regulation (43CFR-9230). Costs of the range management program would be reduced by lowering pay levels of the remaining range positions.
5. On allotments where no range improvement projects were included in the proposed AMP, the grazing use levels would be expected to remain unchanged with this alternative.

6. On allotments where range improvement projects were included in the proposed AMP, the grazing use levels would be expected to drop 10 percent with this alternative.

7. On AMPs where reductions were identified in table I-2 (pp.I-5 f.), no further reduction would be expected.

8. Unalloted management units would continue to be unallotted with this alternative.

Range users (allottees) would be required to continue maintenance of existing range improvements on NRL in a servicable condition. The allottees would be allowed to construct new range improvements on NRL with prior approval from BLM.

Soils

A loss of soil through erosion would affect the production potential of the soils with some loss in ability to support plants for cover.

This alternative would not prevent concentrated livestock use of vegetation on certain favored locations (around watering sites, salt licks, and areas easily accessible). Excessive utilization of forage, soil trampling, and disturbance by livestock in these locations would continue to initiate gully erosion.

Steep and erodible soil areas grazed by livestock would continue to deteriorate. Erodible stream banks would continue to deteriorate from livestock trampling.

Water

Reductions in levels of grazing management would have an overall slightly detrimental effect upon water resources of NRL watershed. Basin-wide water resources would probably not be affected. Reductions in levels and numbers of professional range management personnel within the local BLM organization would likely mean less attention given to water resource problems on the ground. Some potentially adverse watershed conditions would go unnoticed.

There would be little change in the general erosion or sediment yield rate from the present condition from reduced grazing management in the San Luis Resource Area. There is presently a downward trend in range condition with resultant increases in sediment yield, on the following allotments:

Poncha Pass West
West Clover Creek
Nye
Findley Gulch
Poison Gulch
Trickle Mountain
Mitchell
West Tracy Ridge
Upper Coolbroth
Elephant Rocks
Alder Creek
Bowen
Branch
McMahon
Greenie Mountain
La Jara Creek
Grande
Railroad
Llano
Rio Grande Common
La Sauses
Foothills
Blanca
Zapata Falls

This would be halted through reductions in grazing use.

Very little can be concluded, quantitatively, about any expected changes in hydrologic conditions, but the overall trend would be slightly downward.

Animal wastes in concentration areas deposited or transported into water would disrupt nutrient cycling and affect the fertility of streams and water bodies. In areas where water sources are limited to springs, small or intermittent streams, and small ponds, the contamination could be serious. In areas where the water supply is adequate for dilution, contamination would be minimal.

Vegetation

On the ten existing AMPs (54,479 acres) and the 9 units eliminated from grazing, range conditions would improve as in the Proposed Action. There would be little or no change in range condition on the remaining 146 units. Invasion of less desirable plants would continue where selective grazing reduces the vigor of forage species preferred by livestock.

Vegetative composition would continue to change toward plant species which are more tolerant to grazing pressures.

Root systems would be less well-developed and with the depth and spread of their roots reduced, the volume of soil from which minerals and moisture could be absorbed would be limited. Roots would become less effective in binding the soil against forces of erosion and plants would become more susceptible to drought. Plant litter would be reduced.

Forage production, while fluctuating widely in response to annual climatic conditions, would generally decline.

Overall range condition would be: Good--93,055 acres, Fair--241,838 acres, and Poor--181,478 acres.

Wildlife

Reduced levels of grazing management would be expected to eventually allow overgrazing and deterioration of range vegetation in most allotments. This would result in serious levels of competition between livestock and big-game animals, and big-game herds would decrease.

Table VIII-7 lists the projected impacts of this alternative on big-game forage and populations. Forage would be expected to decrease at least 20 percent and probably more for all big-game species. This loss of forage, in addition to other losses of habitat to conflicting human uses unrelated to grazing, would result in a decrease in big-game population by a minimum of 30 percent from present levels by the year 2005. Furthermore, hunting opportunity and economic return from hunting would decrease proportionately.

TABLE VIII-7. PROJECTED CUMULATIVE IMPACTS OF ALTERNATIVE C, CUSTODIAL MANAGEMENT ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA BY 2005.

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL Change %	No.	Population after Change
Mule Deer	4,500	-20%	-30%	1,350	3,150
Elk	2,600	-20%	-30%	780	1,820
Antelope	1,145	-20%	-30%	343	802
Bighorn Sheep	250	-20%	-30%	75	175

* The maximum estimated population to use NRL at least part of each year.

** Forage provided by NRL.

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

Habitat for all wildlife would decline in condition and populations of most species would decline. Overgrazing would be especially detrimental to small birds and mammals, which utilize ground story vegetation for food and cover, and those species which depend on riparian woodlands.

Waterfowl nesting cover would be destroyed by overgrazing and trampling of shoreline vegetation. Livestock watering facilities would probably not be available for wildlife except when livestock were using the allotments.

These impacts would be expected in a majority of the allotments, but overuse would not be expected in some because of individual licensee's interest in the welfare of wild animals.

Endangered Species

Reductions in the level of grazing management could further jeopardize any black-footed ferrets that may remain in the San Luis Resource Area. Many livestock operators feel that prairie dogs are competitors with livestock for forage, and increased prairie dog control would likely occur with decreased supervision of grazing.

The anticipated deterioration of range condition would also decrease the food and cover available for the prey of peregrine falcons on NRL and further jeopardize their existence in the area.

Aquatic and Riparian Communities

Under reduced levels of grazing management, riparian and aquatic conditions would continue to decline until the majority of the riparian communities had been destroyed. Only the areas that were blocked from grazing would retain any semblence of a riparian community, and the deteriorating stream conditions and increased erosion upstream from these protected areas would contribute to their decline.

Aquatic communities would decline commensurate with the decline of the riparian habitat. Increased erosion and siltation would destroy the existing communities that provide habitat for fish and amphibians.

Recreation

Implementation of Custodial Management would be expected to result in general reductions in numbers of bighorn sheep by 25 percent, antelope by 30 percent, mule deer by 21 percent, and elk by 16 percent. This would probably result in the total closure of bighorn sheep hunting and near total closure of antelope hunting. Deer and elk hunting would probably continue, but at lower levels than at present. An estimated 6,935 hunter-days of use would be lost by the implementation of this alternative.

Opportunities for other recreation uses such as fishing and the operating of vehicles on primitive roads could be severely curtailed due to the closing of existing quasi-public access routes across private lands, thereby leaving the public lands inaccessible for public use.

Livestock Grazing

With this alternative, grazing would continue at about the same level as current valley-wide use levels. Estimated allotment-by-allotment use levels and projected availability (AUMs) are shown in table VIII-8. Some deviation from the use levels shown can be expected, depending on the extent to which individual ranchers adopt more intensive management systems or construct improvements on their own. Trespass would be controlled in accordance with regulatory authority, with long-term licenses specifying livestock numbers and seasons of use.

TABLE VIII-8. GRAZING LEVELS FOR ALTERNATIVE C, CUSTODIAL MANAGEMENT

Management Unit (Number and Name)	Proposed Use (AUMs)	Projected 1/ Availability (AUMs)
1P Poncha Pass-West	375	375
2E Poncha Pass-East and	380	534*
East Side	1,875	2,466
3C Round Hill	10	10
4P West Clover Creek	45	--
5C Clover Creek	5	--
6C San Luis Creek #1	6	--
7P Alder	100	--
8C San Luis Creek #2	12	--
9E Turquoise Gulch	539	960
10E Kelly Creek	566	900
11P Kerber Creek	247	--
12P South Kerber Creek	12	--
13C North Kerber Creek	18	--
14E Noland Gulch	541	900
15P Nye	46*	--
16P East & West San Luis Creek	236	--
17C Section 35 Tract	20	--
18C Junction	20	--
19C Section 13 Tract	12	--
20U Unallotted	--	--
21C Silver Creek F.R.	8	--
22P Piney Creek	154	--
23P Steel Canyon	189	--
24P Mirage	168	--
25E Valley View Hot Springs	427	600
26Eg Garner Creek	None	--
27Eg South	None	--
28P Cotton Creek	281	--
29C Noland Gulch	45	--
30C South Kerber Creek	12	--
31P Hutchinson	69	--
32U Unallotted	--	--
33U Unallotted	--	--
34P Mineral Hot Springs	927	--
35U Unallotted	--	--
36P McIntyre Gulch	280	--
37U Unallotted	--	--
38U Unallotted	--	--
39P Findley Gulch	753	--
40C Calvert Fenced F.R.	14	--
41P Laughlin Gulch	408	--
42P Poison Gulch	859	--
43C Ward Fenced Tracts	18	--
44C Indian Creek	7	--
45P Cross Creek	270	--
46P Trickle Mountain	776	--
47P Sheep Creek	143*	--
48P Taylor Canyon	220	--
49C Meadow Fenced F.R.	20	--
50P Rabbit Canyon	263	--
51E Saguache Park (USFS-BLM)	119	200
52P Hat Springs	291	--
53P Robb Ranch	113	--
54C Mesa	20	--
55P Mill Hill	237	--
56P Higgins Spring	44	--
57P Mitchell	8*	--
58P West Tracy Ridge	15*	--
59P Tracy Ridge	45	--
60P Tracy Cattlemen's	2,562	--
61P Tracy Individual	100	--
62U Unallotted	--	--
63P Biedell Creek	155	--
64P East of Carnero Creek	567	--
65P Upper Coolbroth	74	--
66P Lower Coolbroth	29	--
67P Carnero Creek	non-use	--
68P La Garita	non-use	--
69P Elephant Rocks	93	--
70P Rio Grande Canal	non-use	--
71C Indian Head	28	--
72C County Line	18	--
73P Alder Creek	12*	--
74Eg Masonic Park	None	--
75C Show Creek	44	--
76P Sanderson	19*	--
77P Bowen	21	--
78P Schrader Creek	non-use	--
79P Branch	non-use	--
80P Pup Peak	364	--
81P Limekiln	333	--
82P Nicomodes	274	--
83P Raton Creek	348	--
84P Rock Creek	1,032	--
85P McMahon	1,158	--
86P Greenie Mountain	538	--
87P Gato-Hutchinson	205	--
88P Triangle	189*	--
89P Alamosa River	27*	--
90C Alamosa Prairie	11	--
91U Unallotted	--	--
92C Chicago Bogs	52	--
93P Posito Creek	315	--

1/ Estimated that would occur under "custodial" management in 2005

* Average annual use; not used all years

TABLE VIII-8. GRAZING LEVELS FOR ALTERNATIVE C, CUSTODIAL MANAGEMENT (cont.)

Management Unit (Number and Name)	Proposed Use (AUMs)	Projected 1/ Availability (AUMs)	Management Unit (Number and Name)	Proposed Use (AUMs)	Projected 1/ Availability (AUMs)
94P Jadero Flat	290	--	130C Allotment B	3	--
95P Poso Creek	185	--	131U Emperius	--	--
96P Capulin	528	--	132P Four Mile	non-use	--
97P Romero Canyon	114	--	133P Tobin Creek	212	--
98P Ra Jadero Canyon	559	--	134P Foothills	257	--
99P Cinder Pits	1,044	--	135C Dow Pasture	14	--
100E Ciscom Flat	192	400	136C Phiffer Pasture	4	--
101U Hot Creek	--	--	137P Blanca Allotment	0	--
102P La Jara Creek	non-use	--	138P Dry Lakes	122	--
103C Del Rancho	12	--	139C Caldwell Pasture	13	--
104Eg La Jara Canyon	None	--	140Eg Park Pasture	None	--
105Eg Pastures	None	--	141P Zapata Falls	221	--
106P Little Mogotes	1,300	--	142C Bachelor Lake	24	--
107P Grande	392	--	143C Spring Pasture	10	--
108P Mogote Flat	185	--	144C Sand Pasture	10	--
109P Poso	248	--	145C Crow Pasture	40	--
110P Los Mogotes	587	--	146C Section 15 Lease	8	--
111P Big Horn Creek	53*	--	147C Section 15 Lease	7	--
112P Railroad	143	--	148Eg North Pasture	None	--
113P LLano	135	--	149U Unallotted	--	--
114U Unallotted	--	--	150C Dry Lakes	4	--
115P Alta Lake	518	--	151U Unallotted	--	--
116E Twin Lakes	653	900	152U Unallotted	--	--
117P River	180	--	153U Unallotted	--	--
118Eg Mondragon Individual	None	--	154U Unallotted	--	--
119P South Valley	82*	--	155U Unallotted	--	--
120P Pinon	354	--	156U Unallotted	--	--
121E Kiowa Hill	208	430	157U Unallotted	--	--
122P Braiden	54	--	158U Unallotted	--	--
123P Eight Mile	191	--	159E Klondyke (USFS-BLM)	47	120
124P Pinon Hills	352	--	160C Phone Line	24	--
125P Rio Grande Common	754	--	161C Big East	40	--
126P La Sauses	115	--	162C Hellgate	29	--
127Eg Saddleback Mountain	None	--	163C Sheep Trail	11	--
128C Oxbow	8	--	164U Terract Lakes	--	--
129P Rio Grande	88	--	165U Bonanza	--	--
			TOTAL	31,460	34,323

Considering the assumptions associated with this alternative, projected forage availability would total 34,323 AUMs annually. Increased forage availability associated with existing AMPs would increase total availability to more than current estimated actual use (about 33,000 AUMs). However, total availability would be less than current licensed use (34,999 AUMs).

The use-character of the lands involved would remain essentially the same. There will, however, be some future, unquantifiable reductions expected if other (non-range) resource values are determined to be of major significance and related activity (management) plans involving further reductions are implemented.

Archaeological Resources

Increase site losses and damage due to soil erosion could be expected if overgrazing would result from reduced management levels.

Historical Values

This alternative would provide no protection for historical properties and little or no protection for historical sites from either livestock or human damage.

Socio-Economic Conditions

Population

With projected grazing levels remaining between recent estimated actual use and current licensed levels, no discernible population changes are expected.

Income

Range Livestock Related Income

Since this alternative would result in relatively small changes in actual use, only small region-wide income effects would be expected. Both positive and negative income effects would be felt by individual operators, depending on whether their use levels increased or decreased. Based on 1969-70 data, the direct income effects would be $1.56 per AUM gained or lost, with region-wide direct and indirect income effects totaling $2.39 per AUM gained or lost. However, since actual use levels would remain essentially unchanged, the indirect income effects ($0.83 per AUM) would not change. The indirect effects would be felt only to the extent that individual permittees who gained or lost AUMs did business with different farm supply outlets, trucking and marketing firms, and so forth.

Projected availability in 2005 would total 34,323 AUMs annually. This exceeds the 1975 estimate by about 1,500 AUMs and would increase range livestock income by about $3,592 (1,500 X $1.56 X 1.535 = $3,591.90). This change is so insignificant (0.006 percent of 1970 estimated range livestock income) that no real impact would be discernible. Actually, most users would experience slight reductions in grazing use. Users with existing AMPs are expected to realize increased forage availability. These ten operators could realize gradual increases in income while decreases were felt by all other operators.

In summary the livestock-related income effects would show up primarily in a different distribution of income in comparison with present patterns. The distribution of these impacts can be determined by comparing the present licensed use (table III-9, pp.III-89 f.) and projected availability under the custodial alternative (table VIII-8, pp.VIII-42 f.)

Construction-Related Income

Allottees could install improvements with BLM approval if they desired. While the actual number and kind of improvements to be installed is unknown, private users would find spring developments, some wells, stock tanks, and fencing advantageous. Thus, an estimated 20 percent of the improvements described in the Proposed Action would be installed at a cost of about $320,791. The income effects of this construction would total an estimated $64,158 during construction plus annual maintenance costs of $14,788 (4.6 percent of installation costs), generating annual income impacts of $4,437.

Income associated with maintenance of existing improvements would continue, paid primarily by the users.

Recreation-Related Income

Reduced levels of grazing management would mean fewer water developments, keeping grazing at present levels, and would largely eliminate the consideration of rest rotation or other management practices in order to optimize big-game habitat. Big-game/domestic livestock competition would continue at near present levels. The net effect is expected to be reductions in the numbers of bighorn sheep by 25 percent, antelope by 30 percent, deer by 21 percent, and elk by 16 percent.

If hunter expenditures were reduced in proportion to the indicated species population reductions, the regional gross expenditures effect would be a reduction of $875,990. The regional reduction in income is estimated to be $175,198 annually.

Other Income Effects

In order to carry out continuing regulatory authority, including issuing licenses and billings and patrolling NRL for possible trespass violations, it is expected that the BLM staff in the Alamosa and Canon City offices would remain near pre-implementation levels.

Employment

The implementation of this alternative would generate employment impacts of about five man-years of work* if estimated improvements were constructed. There would be no net change in range livestock employment associated with the estimated grazing level and about fourteen man-years of employment lost annually as a result of reduced big-game hunter expenditures. Thus, the stability in range livestock employment and generation of five man-years of construction-related employment would be offset by losses in recreation-related employment, which would total fourteen man-years annually by 2005.

Social Well-being

The net loss of employment would contribute to the already below-average conditions. Though the impact of this alternative would be regionally insignificant, ranchers facing reductions and the persons who would lose jobs dependent upon hunting-recreational spending would both be adversely affected.

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* Assumes an average annual salary of $12,000

Socio-Cultural Attitudes

This alternative would fail to satisfy expressed desires for economic growth but would be relatively inoffensive in that imposed grazing systems and use reductions would be minimal. Local self-deterministic options would be preserved, though those receiving use reductions would individually and collectively find the proposal offensive.

Some local and national-regional groups would likely view the alternative as inadequate in its protection and enhancement of some resource values while other groups would applaud its laissez-faire approach. As in other cases, public debate and controversy would help mold the final form to be implemented.

Social Support Facilities and Services

Implementation of this alternative would imply that grazing qualifications totaling about 2,500 AUMs annually would be lost. Theoretically, then, the loss in value of base property (income foregone and relative improvements) would total about $208,333, with a related decrease in the tax base of $62,500. Since actual use would remain essentially constant, no real loss in the value of base property would occur. Theoretical tax base reduction would amount to only 0.035 percent of 1974 regional assessed valuation.

No loss of services, facilities, utilities, and the like would be expected.

Alternative D: Reduced Management on Specific Allotments

Description

This alternative was developed by restricting intensive management to those management units which would be economically viable. In addition, fewer range improvements would be constructed than are required with the Proposed Action. (See Table VIII-9 for net reductions in range improvement by management unit.)

This alternative is a modification of the Proposed Action which provides for implementation and operation of grazing management at reduced costs. Management would be as follows:

1. Fifty-eight proposed and ten existing AMPs would be managed as described in the Proposed Action on 372,548 acres.

2. Twelve revised AMPs would be implemented on 78,221 acres. These AMPs were revised by reducing the number of improvements and by combining management units.

3. Livestock grazing would be eliminated on nine management units totaling 5,930 acres as described in the Proposed Action.

4. Custodial management would be implemented on 53 units.

    a. Custodial management would take place on 16,625 acres in 39 units, the same as in the Proposed Action.

    b. An additional 14 units would be managed custodially (23,147 acres). These units were proposed for intensive management in the Proposed Action, but expected benefits were not sufficient to justify

TABLE VIII-9. REDUCTIONS IN IMPROVEMENTS

ALLOTMENT NUMBER	ALLOTMENT NAME	FENCES	PIPELINES	TROUGHS	STORAGE TANKS	CATTLEGUARDS	CHECK DAMS	BOUNDARY MARKERS	WELLS	EASEMENTS	SPRINGS	RESERVOIRS	FENCE REMOVAL
		MI.	MI.							MI.			MI.
15P	Nye	.96	.75	1						.75			
39P	Findley Gulch								1		1	1	
56P	Higgins Spring	.5			1						1	1	
58P	West Tracy Ridge										1		
81P	Limekiln		4.5	10	2		10	200	1				
82P	Nicomodes			1			3						
83P	Raton Creek	.5											
96P	Capulin		2.5	3				30	1				
109P	Poso	2.5	3	3	1				1			1	
115P	Alta Lake	6.7	5	5	1				1				
117P	River	2.7	1.75	3									
119P	South Valley		.5	3								2	
120P	Pinon	3	5	4	1			30	1	2			
123P	Eight Mile	9.6	4	5	1							2	
125P	Rio Grande Common	20	6.5		2								4
126P	La Sauses	2.5	2.75	3									
129P	Rio Grande	3.25	1.5	2		2			1				
132P	Four Mile	3											
137P	Blanca	7	.5	4									
	TOTAL (Range Improvement Reduction)	62.21	38.25	47	9	2	13	260	7	2.75	3	6	4
	TOTAL (Range Improvements which would be Constructed with this Alternative)	228.63	117.37	165	12	19	33	2033	15	1.75	24	40	.38

more intensive management systems. The term permit on these units would specify the number and class of livestock and the season of use.

5. Unallotted status would continue on the 22 units as described in the Proposed Action (19,900 acres).

This alternative is less costly than the Proposed Action but does not significantly alter grazing use. Upon implementation, livestock use would be 34,664 AUMs annually. There is no current commitment regarding future allocation of increased productivity.

Soils

This alternative will have the same impacts upon the soils as are described in Chapter Three of the Proposed Action except that less soil disturbance will occur because of a reduction in the number of range improvements.

With the reduction in the number of range improvements, the total soil loss resulting from this alternative will be 9,013 tons as compared to 12,330 tons for the Proposed Action.

Water

This alternative contains 27 allotments which differ from the original proposal. The 12 revised AMPs (including 13 management units) would have impacts similar to the proposal. Five of the 14 additional custodial units would not realize the projected sediment yield decreases. Thus, annual sediment yield would be 1336 tons more than with the Proposed Action.

With this alternative, there would be a reduction in the number of wells, reservoirs, springs, and check dams from the original proposal. A total of 40 earthen reservoirs and 33 check dams would be constructed, resulting in delayed storm runoff, increased ground water recharge (about 40 acre feet annually), and increased evaporation losses (less than 70 acre feet annually).

Vegetation

Vegetative conditions on 14 management units would not improve as it would with the Proposed Action since the degree of management on these management units would be custodial instead of intensive (AMPs). Vegetative conditions by 2005 would be unchanged from the existing conditions on these management units. On the remaining 151 management units, the effects on vegetation from this alternative would be the same as the Proposed Action. Range condition with this alternative would be 241,258 acres of NRL in good condition, 138,463 acres of NRL in fair condition, and 91,650 acres of NRL in poor condition.

An estimated 380 acres of vegetation would be temporarily removed from production and 66 acres permanently removed from production as a result of the construction of range improvements.

Wildlife

Implementation of this alternative would have impacts on wildlife habitat and populations similar to the Proposed Action with one notable exception: useable pronghorn antelope forage would be expected to increase by about 20 percent as compared to 25 percent projected for the Proposed Action. This would result in a 15 percent population gain rather than 18 percent as in the Proposed Action. Table VIII-10 shows the projected population and forage changes for big game animals under the cost-effective alternative.

Antelope forage would not increase as much in this alternative as in the Proposed Action because less intensive management proposed in several of the revised AMPs--notable Alta Lake, South Valley, Pinon, Eight-Mile and La Sauses--would allow antelope-livestock forage competition at a higher-than-desirable level. Restrictions on antelope movement would not be improved on four allotments, totaling 21,746 acres (Nye, Alta Lake, Eight-Mile and La Sauses) since existing net-wire fences would not be modified in these revised AMPs.

TABLE VIII-10. PROJECTED CUMULATIVE IMPACTS OF ALTERNATIVE D ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA BY 2005

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL Change %	Projected Population, NRL Change No.	Projected Population, NRL Population After Change
Mule Deer	4,500	+20	+5%	220	4720
Elk	2,600	+20	+5%	130	2730
Antelope	1,145	+20%	+15%	172	1317
Bighorn Sheep	250	+30%	+20%	50	300

*The maximum estimated population to use NRL at least part of each year.
**Forage provided by NRL

SOURCE: Population estimates derived from Colorado Division of Wildlife (DOW) Big-Game Harvest Statistics and estimates by DOW and BLM personnel. Projections by BLM personnel.

This alternative would also be less beneficial to wildlife in general than the Proposed Action since a total of 54 fewer new water sources would be created. This is about 20 percent of the total new water sources in the Proposed Action.

Aquatic and Riparian Communities

The impacts of this alternative on aquatic and riparian habitat would be the same as those resulting from the Proposed Action.

Land Use

Grazing

With implementation of this alternative, domestic livestock use would be 34,664 AUMs annually. This is 335 AUMs fewer than current licensed use (34,999 AUMs) and 38 AUMs more than the annual use associated with the proposed action. This slight increase results from annual use on custodial units that were formerly designated for intensive management.

Over the longer run, projected forage availability is 52,692 AUMs annually, or 865 AUMs fewer than with the Proposed Action (53,557 AUMs). Thus, implementation of 14 fewer AMPs, while bringing estimated costs down to or below benefits on all units, would reduce future availability of forage.

Reductions in qualifications due to unsuitable range, changes in classes of livestock, and increases in suspended non-use would total

2,450 AUMs, as with the Proposed Action. Average actual use would increase by about 2,000 AUMs annually if all operators used their full licensed allocations.

In summary, grazing use would be similar to the Proposed Action except for the specific but relatively small changes noted in Table VIII-11. As the proposal is implemented, actual use would increase by about 2,000 AUMs over current actual use levels. The long-term effect would also be largely similar to the Proposed Action except on units where productivity would be reduced as a result of less intensive management during the interim or response period.

TABLE VIII-11. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/	Alternative D Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
1P Poncha Pass West		555	375	500	1,603
2E Poncha Pass East (and)		380	380	) 534	
East Side		1,874	1,875	) 2,466	7,003
3C Round Hill		10	10	10	**
4P West Clover Creek	Custodial	57	45	45	138
5C Clover Creek		5	5	5	**
6C San Luis Creek #1		6	6	6	**
7P Alder	Custodial	133	132	133	949
8C San Luis Creek #2		12	12	12	**
9E Turquoise Gulch		539	539	960	1,734
10E Kelly Creek		566	566	900	2,460
11P Kerber Creek		274	274	500	1,778
12C South Kerber Creek		12	12	12	**
13C North Kerber Creek		18	18	18	**
14E Noland Gulch		541	541	900	1,932
15P Nye	Custodial	90	50	50	476
16P East & West San Luis Creek	Revised AMP	272	262	420	853
17C Section 35 Tract		18	20	20	**
18C Junction		20	20	20	**
19C Section 13 Tract		12	12	12	**
20U Unallotted		--	--	--	**
21C Silver Creek F.R.		8	8	8	**
22P Piney Creek		180	171	450	629
23P Steel Canyon		210	210	500	1,120
24P Mirage		187	187	300	813
25E Valley View Hot Springs		427	427	600	1,642
26Eg Garner Creek)					**
27Eg South)		30	None	None	**
28P Cotton Creek		312	312	550	1,476
29C Noland Gulch		45	45	45	**
30C South Kerber Creek		12	12	12	**
31P Hutchinson		79	77	100	362
32U Unallotted		--	--	--	**
33U Unallotted		--	--	--	**
34P Mineral Hot Springs		744	1,030	1,450	4,061
35U Unallotted		--	--	--	**

a/ Key to type of proposed component indicated in management unit number:
E = Existing intensive management of grazing (AMP)
P = Proposed intensive mangement of grazing (AMP)
Eg = Elimination of grazing
C = Custodial management of grazing
U = Unallotted status of range

b/ 1975 Licensed Use

c/ Average annual use. AUMs from proposed action

d/ Although production is expected to increase to the amounts shown in this column, BLM would not be committed to any additional livestock use

e/ Potential productivity for all animals (livestock and wildlife) in AUMs

* Denotes average annual use from AMPs which include years of non-use or varying use levels

** Potential productivity of soils was determined only for the intensive management units

*** 132P Four Mile and 137P Blanca were combined

TABLE VIII-11. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/		Alternative D Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
36P	McIntyre Gulch		311	311	550	1,542
37U	Unallotted		--	--	--	**
38U	Unallotted		--	--	--	**
39P	Findley Gulch	Revised AMP	1,127	753	1,050	4,116
40C	Calvert Fenced F.R.		14	14	14	**
41P	Laughlin Gulch		453	453	800	2,797
42P	Poison Gulch		884	955	1,500	6,742
43C	Ward Fenced Tracts		18	18	18	**
44C	Indian Creek		7	7	7	**
45P	Cross Creek		300	301	650	2,811
46P	Trickle Mountain		1,195	776	1,800	8,390
47P	Sheep Creek		210	159*	250	1,075
48P	Taylor Canyon		245	245	320	1,536
49C	Meadow Fenced F.R.		20	20	20	**
50P	Rabbit Canyon		289	292	350	1,612
51E	Saguache Park USFS-BLM		119	119	200	900
52P	Hat Springs		323	323	410	1,714
53P	Robb Ranch		113	113	160	827
54C	Mesa		20	20	20	**
55P	Mill Hill		263	263	410	2,248
56P	Higgins Spring	Custodial	49	49	50	204
57P	Mitchell	Custodial	51	25	50	232
58P	West Tracy Ridge	Custodial	50	15	50	260
59P	Tracy Ridge	Custodial	44	45	45	350
60P	Tracy Cattlemen's		2,842	2,847	3,350	9,958
61P	Tracy Individual		99	100	180	1,397
62U	Unallotted		--	--	--	**
63P	Biedell Creek		172	172	250	1,241
64P	East of Carnero Creek		620	630	1,200	4,810
65P	Upper Coolbroth		118	74	140	557
66P	Lower Coolbroth		58	29	60	257
67P	Carnero Creek		Non-use	104	240	465
68P	La Garita		Non-use	73	120	539
69P	Elephant Rocks		200	93	250	1,036
70P	Rio Grande Canal		Non-use	225	300	1,302
71C	Indian Head		28	28	28	**
72C	County Line		18	18	18	**
73P	Alder Creek		20	13*	30	56
74Eg	Masonic Park		22	None	None	**
75C	Show Creek		44	44	44	**
76P	Sanderson		32	21*	21	202
77P	Bowen		32	21	50	117
78P	Schrader Creek	Custodial	Non-use	42	45	183
79P	Branch		Non-use	95*	180	536
80P	Pup Peak		404	404	500	1,977
81P	Limekiln	Revised AMP	370	370	500	1,487
82P	Nicomodes	Revised AMP	303	304	340	968

TABLE VIII-11. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/	Alternative D Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
83P Raton Creek	Revised AMP	384	386	440	1,444
84P Rock Creek		1,147	1,147	1,440	5,323
85P McMahon		1,310	1,287	1,550	8,983
86P Greenie Mountain		128	598	700	2,495
87P Gato-Hutchinson		228	228	270	908
88P Triangle		315	210*	420	1,925
89P Alamosa River	Custodial	40	40	40	234
90C Alamosa Prairie		11	11	11	**
91U Unallotted		--	--	--	**
92C Chicago Bogs		52	52	52	**
93P Posito Creek		218*	350	550	5,912
94P Jadero Flat		323	322	580	5,361
95P Poso Creek		206	206	260	684
96P Capulin	Revised AMP	587	588	620	1,708
97P Romero Canyon		114	127	200	2,307
98P Ra Jadero Canyon		711	621	800	8,974
99P Cinder Pits		1,179	1,160	1,850	5,497
100E Ciscom Flat		192	192	400	1,143
101U Hot Creek		--	--	--	**
102P La Jara Creek		Non-use	30*	60	204
103C Del Rancho		12	12	12	**
104Eg La Jara Canyon		18	None	None	**
105Eg Pastures		21	None	None	**
106P Little Mogotes		1,169	1,444	1,700	5,983
107P Grande		443	436	520	4,367
108P Mogota Flat		206	206	280	1,131
109P Poso	Revised AMP	315	276	520	1,819
110P Los Mogotes		507	652	800	4,834
111P Big Horn (Creek)		90	59*	100	435
112P Railroad		210	159	400	1,838
113P Llano		187	150	500	2,095
114U Unallotted		--	--	--	**
115P Alta Lake	Revised AMP	711	575	1,200	3,714
116E Twin Lakes		653	653	900	2,491
117P River		200	200	200	710
118Eg Mondragon Individual	Custodial	4	None	None	**
119P South Valley	Custodial	139	136	140	596
120P Pinon	Custodial	392	393	400	2,058
121E Kiowa Hill		208	208	430	1,501
122P Braiden	Custodial	60	60	60	294
123P Eight Mile	Revised AMP	238	212	520	1,604
124P Pinon Hills		538	391	660	2,450
125P Rio Grande Common	Revised AMP	860	838	1,550	4,775

TABLE VIII-11. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/	Alternative D Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
126P La Sauses		141	128	260	822
127Eg Saddleback Mountain		32	None	None	**
128C Oxbow		8	8	8	**
129P Rio Grande	Custodial	103	98	100	1,488
130C Allotment B		3	3	3	**
131U Emperius		--	--	--	**
132P Four Mile	Revised AMP***	Non-use	7*	30	116
133P Tobin Creek		235	235	600	2,641
134P Foothills		279	257	500	2,065
135C Dow Pasture		14	14	14	**
136C Phiffer Pasture		4	4	4	**
137P Blanca Allotment	Revised AMP***	36	28*	530	1,900
138P Dry Lakes		139	139	580	2,125
139C Caldwell Pasture		13	13	13	**
140Eg Park Pasture		12	None	None	**
141P Zapata Falls		244	245	480	2,231
142C Bachelor Lake		24	24	24	**
143C Spring Pasture		10	10	10	**
144C Sand Pasture		10	10	10	**
145C Crow Pasture		40	40	40	**
146C Section 15 Lease		8	8	8	**
147C Section 15 Lease		7	7	7	**
148Eg North Pasture		40**	--	--	**
149U Unallotted		--	--	--	**
150C Dry Lakes		4	4	4	**
151U Unallotted		--	--	--	**
152U Unallotted		--	--	--	**
153U Unallotted		--	--	--	**
154U Unallotted		--	--	--	**
155U Unallotted		--	--	--	**
156U Unallotted		--	--	--	**
157U Unallotted		--	--	--	**
158U Unallotted		--	--	--	**
159E Klondyke (USFS-BLM)		47	47	120	273
160C Phone Line		24	24	24	**
161C Big East		40	40	40	**
162C Hellgate		29	29	29	**
163C Sheep Trail		11	11	11	**
164U Terrace Lakes		--	--	--	**
165U Bonanza		--	--	--	**
Totals		34,999	34,664	52,664	208,442

Recreation

This alternative will have the same impacts as the Proposed Action for visitors engaged in driving for pleasure, fishing, and snowmobiling.

Impacts will be the same as those described for the Proposed Action for visitors engaged in hiking, pinon nut collecting, hunting, off-road vehicle use, four-wheel drive use, and motorcycle use. The impact, however, will be less significant due to 62.21 miles less fencing proposed in this alternative than in the Proposed Action.

Aesthetics

The visual impacts identified for the South Valley Allotment in the analysis of the Proposed Action will not occur if this alternative is selected.

Although the impacts would not have exceeded the maximum visual contrast standards discussed in the analysis of the Proposed Action, the visual impacts of this alternative would be less than with the Proposed Action due to many projects being deleted from the development plan.

Number To Be Deleted	Type of Project
62.21 miles	Fence
38.25 miles	Pipeline
47	Troughs
9	Storage Tanks
2	Cattleguards
13	Check Dams
260	Boundary Markers
7	Wells
3	Springs
6	Earthen Reserviors

Socio-Economic Conditions

Population

Grazing use upon implementation and in the future will be similar to the Proposed Action. Other impacts are also sufficiently similar that no real differences from the Proposed Action are expected. This alternative will not likely influence ongoing regional population trends or levels and thus will generate no perceptible impact even though the alternative will tend to stabilize the region's livestock industry.

Income

Range Livestock Related Income

Though a slight decrease in licensed use levels would occur upon implementation (335 AUMs), actual use would increase by about 2,000 AUMs, yielding a total direct and indirect income increase of $4,789 as with the Proposed Action.

Projected future availability would be 17,693 AUMs more than with current licensed levels. Combining this with the 2,000 AUMs discussed above indicates that future productivity would be increased by 19,693 AUMs for a direct range livestock income effect of $30,721 and a total direct and indirect income effect of about 47,157.

Contract Construction Related Income

Improvements associated with this alternative would have an initial construction cost of $1,180,110 over the eight-year implementation period. Local households would capture an estimated $236,022 of these expenditures as income. Both amounts are about 75 percent of the similar estimates associated with the Proposed Action.

Annual ongoing operation and maintenance costs would total an estimated $53,243. Assuming that this work is more labor intensive than construction, 30 percent of this amount (vs 20 percent for initial construction), or $15,973, would be captured as local income annually.

The burden of maintenance costs upon ranchers would be less than with the Proposed Action since fewer improvements are proposed.

Recreation Related Income

Wildlife related impacts suggest that the regional mule deer population will increase by 3.38 percent, the elk population by 2.71 percent, the antelope population by 15.02 percent, and the bighorn sheep population by 16.67 percent. Multiplying these population increases by estimated sportsmen's expenditures in the San Luis Valley region, as shown in the C.S.U. study, suggests that hunting related expenditures will increase by $145,498. This is slightly less than with the Proposed Action ($5,805).

The income effect is estimated to total $29,099 annually if 20 percent of the expenditures are captured as local income as assumed.

Other Income Effects

This alternative is sufficiently similar to the Proposed Action that six additional employees would be added to the BLM staff to supervise the installation and maintenance of improvements and the operation of the proposed grazing management systems in addition to checking for trespass violations.

As noted earlier, their salaries would total about $70,000 with $46,800 of this amount representing a beneficial income impact to the San Luis Valley region.

These impacts might be reviewed as negative by some taxpayers, however, and would represent a small increase in the government sector of the local economy.

In summary, the annual range livestock income impacts would total an estimated $47,157 with ongoing maintenance income estimated at $15,973 annually. Increases in annual hunter's or sportsmen's expenditures would generate another $29,099 in income with added government employers receiving a total of about $70,000 in income annually. Some negative impacts would be felt by ranch operators who had to pay the maintenance costs to the extent those costs proportionately exceed forage related benefits.

Employment

Initial construction of improvements would generate 19.67 man years'* of employment over an eight-year period. Ongoing operation and maintenance employment would total 1.33 man years annually; however, most of this would likely be absorbed by existing ranch operators, ranch hands, etc. Recreation related expenditures would generate about 2.43 man years of employment annually with the additional BLM employment adding another six jobs annually. Thus, total employment would be increased by between eight and ten jobs annually.

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*Assumes a salary of $12,000 per year

Social Well-Being

The estimated increases in income and employment would generate positive impacts regarding social well-being. However, they are so small when compared with existing deficits and total regional income and employment that little would be changed. As with the Proposed Action, the alternative, if implemented, cannot be viewed as being an action that would change the regional social well-being situation.

Socio-Cultural Attitudes

This alternative involves fewer management plans, provides some stabilization to range livestock industry, generates added income and employment and enhances or protects resource values. Thus, it would be less in conflict with the desire to protect or enhance the vegetative resource and wildlife habitat.

This alternative would still involve the imposition of about 80 livestock grazing management systems. Although costs are lower than with the Proposed Action, maintenance costs would increase for some operators. These impacts would likely generate some controversy and public debate.

Others would be critical of the alternative since it does not maximize wildlife habitat and some other resource values. Thus, the increased cost-effectiveness is achieved at the expense of some potential forage productivity and beneficial wildlife impacts. It appears likely that some interest groups would at least argue that "their" interests or values were shortchanged and request some changes. Overall, the debate or controversy would likely be smaller than with the Proposed Action.

Other Social Support Facilities and Services

The collective effects of this alternative would not likely have a measurable impact on the provision of public goods, services and facilities, i.e., schools, roads, health, welfare, fire and police protection, etc.

The loss of 2,450 AUMs of grazing qualifications, etc., annually would theoretically translate into a loss of about $204,170 in property values. This would reduce the regional tax base by $61,251, or only .005 percent annually. Since this use is not currently being realized, the loss would be more theoretical than real.

Over the longer run, if projected forage availability were allocated to users, the increase of 17,693 AUMs of additional licensed use would translate into 1,474.42 animal units of carrying capacity for an increase of about $1,474,420 in property values. However, there is no current commitment regarding the allocation of future productivity.

The related increase in regional assessed valuation would be $442,326, erasing the theoretical losses and increasing the regional tax base by 0.22 percent.

This later impact, while positive, is thus regionally insignificant and dependent upon future decisions regarding allocations of projected forage availability.

Alternative E: Wildlife Effective

Description

This alternative would be implemented by pursuing the following types of management on the 165 management units:

1. Twenty-seven AMPs, as identified in Table VIII-12, would be implemented as they have been revised specifically for resolution of adverse impacts and to further enhance the various wildlife resources.

2. The remaining 60 proposed and 8 existing AMPs, 9 eliminations of grazing, 39 custodial management units, and 22 unallotted units would be implemented as described in the Proposed Action (Table I-2, p. I-5f.). Annual livestock use would be 33,755 AUMs without commitment for future increases.

To reduce competition for winter forage between domestic livestock and wildlife, livestock grazing during late fall-winter use would be changed to the summer season on 142,236 acres of NRL. Changing the class of livestock (sheep to cattle on four allotments) and reducing livestock grazing 10 to 25 percent, totaling 871 AUMs on 14 allotments, would also reduce competition. In addition to these changes, approximately 7 miles of mountain streams would be fenced and woody vegetation planted to allow recovery of riparian and aquatic communities. This fencing would exclude livestock grazing (51 AUMs) from approximately 104 acres. These fences would be removed in five to ten years, depending on the recovery rate on each stream.

TABLE VIII-12. REVISIONS NEEDED FOR ENHANCEMENT OF WILDLIFE HABITAT

Allotment Number & Name		Proposed Revisions
2E	Arizona-Colorado	Fence approximately 1.0 miles of Fisher and San Luis Creeks
25E	Valley View Hot Springs	Fence approximately 1.7 miles of Garner Creek
31P	Hutchinson	Eliminate fall-winter grazing
36P	McIntyre Gulch	Change season of use to summer and reduce stocking level 25%
42P	Poison Gulch	Fence approximately 2.5 miles of Ford Creek
48P	Taylor Canyon	Change season of use to summer
52P	Hat Springs	Change season of use to summer and fence approximately 1.8 miles of Hat Springs Creek
60P	Tracy Cattlemen's	Eliminate winter sheep use
67P	Carnero Creek	Change season of use to summer
68P	La Garita	Change season of use to summer
70P	Rio Grande Canal	Change season of use to summer and reduce stocking level 25%
80P	Pup Peak	Change season of use to summer and reduce stocking level 10%
82P	Nicomodes	Change season of use to summer and reduce stocking level 10%
85P	McMahon	Change season of use to summer and reduce stocking level 20%
86P	Greenie Mountain	Change season of use to summer
87P	Gato-Hutchinson	Change season of use to summer and reduce stocking level 20%
88P	Triangle	Change season of use to summer and reduce stocking level 20%
95P	Poso Creek	Change season of use to summer and reduce stocking level 10%
96P	Capulin	Change season of use to summer and reduce stocking level 10%
106P	Little Mogotes	Eliminate fall-winter sheep use
107P	Grande	Eliminate late fall sheep use and reduce stocking level 10%
108P	Mogote Flat	Eliminate late fall sheep use and reduce stocking level 10%
111P	Big Horn Creek	Change season of use to summer
120P	Pinon	Change season of use to summer and reduce stocking level 20%
124P	Pinon Hills	Change season of use to summer and reduce stocking level 20%
133P	Tobin Creek	Change season of use to summer and reduce stocking level 10%
141P	Zapata Falls	Eliminate fall grazing

Upon completion of inventory of the riparian and aquatic communities on Lone Tree, Swidinski, Meckt, Decker, Rock, Yankee, Bolton, Neiland, Butterfly, Raspberry, Brook, Cook, Miller, Jack and Can Creeks and prior to the implementation of AMPs, those streams which are found to have condition classifications of "nonexistent," "poor," and "fair" would be fenced temporarily and woody vegetation planted to permit the recovery of riparian and aquatic communities. Fourteen miles of antelope type fencing, three storage tanks, and four watering troughs would be constructed in addition to the range improvements described in the Proposed Action.

Soils

The 104 acres of riparian and aquatic communities in the four allotments that would be fenced would improve the soil conditions along the streams. There would be an increase of organic matter contact of the soil as well as an increase in infiltration rates as the result of those areas being rested from grazing for periods of five to ten years. The effects of these changes would be an increase in ground cover and a decrease in erosion rate.

The changing of the season of use in 18 allotments from fall-winter to summer-early fall would affect the soil conditions in a manner similar to that described in Chapter III (page 3) for spring-summer grazing management units.

With this alternative, 378,093 acres of NRL would experience an increase in erosion rate produced by infrequent, high intensity storms.

Sixty-three thousand forty-six (63,046) acres would continue to experience a decrease in erosion rates as described under the Proposed Action for management units on which fall-winter grazing would occur.

Erosion rates on the remaining 32,777 acres NRL, despite spring or summer grazing, would remain essentially the same as they are now, even with the occurrence of a 50-year storm event. These allotments contain soils that are not susceptible to compaction by livestock because of their texture, which ranges from moderately coarse to very cobbly and stony.

For the remaining 42,455 acres of NRL (elimination, custodial, and unalloted), there would be no changes from those described in the Proposed Action.

The construction of additional range improvements under this alternative would result in a 39-ton increase of soil loss, or 3 percent more than the soil losses of the Proposed Action.

Water

The fencing of 7 miles of mountain streams will contribute to improve channel stability (hydraulic resiliency) along the affected bottoms because plant growth will begin to recover, and the physical disturbance caused by livestock will be removed.

Increases in sediment yield would be expected on 378,093 acres of NRL under the proposed spring-summer grazing management with the occurrence of a 50-year storm event. Based on the estimates made in the

Sediment Yield section, Chapter III, the sediment yield during the 50-year storm would be 231,771 to 236,303 tons, or an increase of 6,752 tons to 11,253 tons over the present yield.

Decreases in annual sediment yield expected on the fall-winter grazing units with this alternative would be 2289 tons per year based on 63,046 acres of NRL, an expected 10 percent decrease in sediment yield on these management units.

The sediment yields on the remaining management units (elimination, custodial, and unallotted) would be the same as described in Chapter III.

The overall annual impact of this alternative would be a decrease of approximately 2,289 tons of sediment from present levels of sediment yield.

Vegetation

The fencing of approximately 7 miles of mountain streams within the boundaries of 4 allotments as listed in Table VIII-12 (p. VIII-69 f.) would improve vegetative condition on an estimated 104 acres. This improvement would consist of an increase in woody vegetation such as willows, alder, aspen, and cottonwood. Desirable grasses such as tufted hairgrass, reedgrasses, mannagrasses, bluegrasses, and sedges would increase as well as desirable forbs such as bluebell.

The elimination of fall-winter grazing and change to summer grazing on 24 of the allotments listed in Table VIII-12 would favor browse species. Browse species such as winterfat, fourwing saltbush, mountain mahogany, and rabbitbrush would be expected to increase. Overall vegetative condition would improve at a slower rate, as grass and forb species are utilized during their critical growth stages.

The 10 to 25 percent reduction in stocking level proposed for 14 of the allotments would reduce the utilization of vegetation.

Of the estimated 490 acres of vegetation that would be temporarily removed from production, an estimated 107 acres would be permanently removed from production due to construction of range improvements.

Range condition by 2005 with this alternative would be similar to the range condition resulting from the Proposed Action.

Wildlife

Table VIII-13 shows the projected population of big-game animals that would be expected if the AMP revisions proposed in Table VIII-12 (pp. 69 f.) were made. These projections are based on changes in availability of forage provided by NRL as a result of reduced competition. These changes are only slightly higher than those projected for the Proposed Action, since the competition that could remain with implementation of the Proposed Action would not be great.

Forage for mule deer and elk would be expected to increase by about 25 percent (5 percent greater than the Proposed Action), but their net population gain would probably not exceed 7 percent. The remaining 18

TABLE VIII-13. PROJECTED CUMULATIVE IMPACTS OF SELECTIVE MODIFICATION OF AMPs ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA BY 2005

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL		
			Change %	Change No.	Population after Change
Mule Deer	4,500	+25%	+7%	315	4,815
Elk	2,600	+25%	+7%	182	2,782
Antelope	1,145	+30%	+20%	229	1,374
Bighorn Sheep	250	+30%	+20%	50	300

*The maximum estimated population to use NRL at least part of each year

**Forage provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and estimates by CDW and BLM personnel.

percent increase in forage would be needed to offset losses in habitat to subdivisions of private lands and other conflicting human uses unrelated to this alternative.

Antelope forage would be expected to increase by about 30 percent (5 percent greater than with the Proposed Action), and this would result in a net population gain of about 20 percent. Antelope would gain proportionately more than deer and elk because higher competition levels exist with livestock at present and the ranges for deer and elk are generally in better condition than antelope ranges. The Trickle Mountain bighorn sheep would not be affected by this alterntive.

Livestock Grazing

The net effect of the changes in class of livestock and season of use, when combined with reductions, indicates that proposed use upon implementation will total 33,755 AUMs. This total is 1,244 AUMs fewer than 1975 licensed use. By 2005, projected forage availability would total 53,557 AUMs, an increase of 19,802 AUMs over implementation levels and 18,558 AUMs more than 1975 licensed use.

In summary, implementation levels would be about 1,000 AUMs fewer than with the Proposed Action and about 1,000 AUMs greater than estimated 1975 actual use.

Socio-Economic Conditions

Population

This alternative would provide a slight stabilizing effect on regional population levels due to projected increases in forage availability and increased big game populations. This effect would be small, however, and would not influence ongoing regional trends.

Income

Range Livestock Related Income

Since use upon full implementation would be less than 1975 licensed use levels (1,244 AUMs) but larger than estimated current use levels (about 1,000 AUMs), the real direct effect on regional range livestock related income would be $1,560 (1,000 x $1.56 = $1,560 x 1.535 = $2,394.60), with the direct and indirect effects totaling about $2,395. This positive income effect is insignificant when compared with the 1970 regional range livestock income of $2,568,000.

Over the longer run, projected availability will increase to 53,557 AUMs, about 20,558 more AUMs than estimated use levels. Though no commitment is being made regarding allocation of future increases in productivity to permittees, the direct and indirect income effect of this increase would be $47,335 annually. This longer term impact is still only 1.84 percent of the 1970 estimated San Luis Valley range livestock income.

Contract Construction Related Income

The addition of four storage tanks, four drinking troughs and 114 miles of fencing would increase total initial construction costs to $1,648,755, $44,800 more than with the Proposed Action. The annual distribution of costs would not be significantly changed, however. The income effects would be about $329,751 from construction.

Annual maintenance costs would total about $75,000 annually, generating ongoing income effects of about $22,500 annually. Beneficial regional income effects would be maximized if local contractors and laborers were utilized.

As with the Proposed Action, maintenance would generate both beneficial and adverse impacts. Local contractors, laborers, and ranch hands would welcome the opportunity for additional employment and income. However, the burden, if carried primarily by users (allottees), would represent a hardship, since one of the major benefits, increased wildlife populations, will not increase their private incomes. Thus, with public benefits being a primary impact, a greater assumption of maintenance responsibilities by the public (federal government or BLM) appears in order.

Recreation-Related Income

Under this alternative, regional mule deer, elk, antelope and bighorn populations would increase by 4.85 percent, 3.79 percent, 20 percent, and 16.67 percent, respectively. Applying these percentage increases to sportsmen's expenditures by game species, as indicated in the Survey of Sportsmen Expenditures for Hunting and Fishing in Colorado (Colorado State University 1975), annual sportsmen's expenditures in the San Luis Valley would increase by a total of $205,681, if game management practices facilitate population increases consistent with improvement of habitat.

If about 20 percent of these expenditures are retained as income by valley residents, the regional income impact would be $41,138 annually. Thus, the recreation/wildlife related income effects exceed those associated with the Proposed Action.

Other Income Effects

This alternative involves only minor changes from the Proposed Action. As a result, BLM would hire six additional employees to supervise the installation and operation of improvements and management systems, just as with the Proposed Action. Their salaries would total an estimated $70,000 annually,* most of which would be a beneficial impact on the San Luis Valley economy.

Employment

This alternative would increase government employment by six positions. During the construction phase, about 27.5 man years' of construction employment would be generated. Maintenance employment would total about two man years annually. This would likely be split among many laborers and ranch hands who would do the maintenance as a part of their existing jobs. Employment generated by increased hunting and fishing expenditures would total an estimated 3.4 man years annually. Government employment would increase by six positions.

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*Assumes an average annual salary of $12,000

In summary, permanent employment impacts would total an estimated 11.4 man years annually. This impact, while beneficial, is regionally relatively insignificant (total regional employment in 1973 was 13,810).

Social Well Being

While the increases in income and employment and contribution to regional economic stability are beneficial, the magnitude of existing deficits in regional social well being are too large to be overcome by this proposal alone. Thus, the impacts are positive but would not begin to correct existing inequities.

Socio-Cultural Attitudes

The local reaction to this alternative would likely be less favorable than to the Proposed Action, since it emphasizes the generation of public goods to be consumed primarily by persons from outside the region. The proposed levels of use would exceed existing actual use and thus be consistent with the desire to stimulate or stabilize the local economy. Resource values would be protected and enhanced; however, the imposition of grazing plans by federal employees would conflict with "local determinism" and "operator prerogative" attitudes and values. The imposition of additional maintenance costs would also disturb operators already facing a cost-price squeeze.

Other national-regional groups would likely view the increased emphasis on improvement of wildlife habitat as desirable and prefer this alternative to the Proposed Action.

In summary, local operators would likely receive this alternative only slightly more cooly than the Proposed Action since the net impacts are so similar.

Social Support Facilities and Services

The reductions in qualifications, etc., as assumed under the Proposed Action (2,450 AUMs), when combined with additional reductions made for wildlife considerations (871 AUMs), would total 3,321 AUMs annually. This translates into a loss of 276.76 annual units of carrying capacity annually. Assuming a market value of $1,000 per animal unit for ranch property, the reduction in base property values would reduce regional total assessed valuation by $83,025, or about 0.04 percent.

Since negative impact is insignificant, no adverse impact on schools, roads, and other public services and facilities is expected. Over the longer run, if the projected increases in available forage were allocated to users, there would be a positive impact on assessed valuation and property values. However, that impact would increase total assessed valuation by only 0.25 percent.

In summary, the impacts of this alternative appear to be positive and would not significantly affect the ability of existing governmental units to provide public facilities and services.

Alternative F: Watershed Effective

Description

This alternative would be implemented by pursuing the following type of management on the 165 management units:

1. Fifty (50) AMPs as listed in Table VIII-14 would be implemented, as they have been revised for reduction of impacts on water resources.

2. The remaining 45 AMPs, 9 elimination of grazing units, 39 custodial management units, and 22 unallotted units would be implemented as described in the Proposed Action (Table I-2, pp.I-5 f.). Grazing use would be the same as in the proposal (34,626 AUMs annually); no increase in use is committed.

To reduce the adverse effects (3 to 5 percent increase in sediment yields) of a 50-year storm event on management units proposed to receive spring-summer grazing, the season of use would be changed to fall-winter grazing on 50 allotments. These allotments encompass 302,431 acres of NRL. A summary of range improvements needed and the resultant disturbances are shown on Table VIII-15.

TABLE VIII-14. AMPs REVISED TO REDUCE IMPACTS ON WATER RESOURCES

Poncha Pass West
Arizona-Colorado
West Clover Creek
Turquoise Gulch
Kelly Creek
Kerber Creek
Noland Gulch
Nye
East & West San Luis Creeks
Piney Creek
Steel Canyon
Mirage
Valley View Hot Springs
Cotton Creek
Mineral Hot Springs
Findley Gulch
Laughlin Gulch
Poison Gulch
Cross Creek
Trickle Mountain
Rabbit Canon
Saguache Park
Mill Hill
Higgins Springs
Tracy Cattlemen's
Biedell Creek
East of Carnero Creek
Rio Grande Canal
Sanderson
Branch
Nicomodes
Raton Creek
Rock Creek
McMahon
Greenie Mountain
Posito Creek
Romero Canyon
Ra Jadero Canyon
Ciscom Flat
La Jara Creek
Little Mogotes
Grande
Mogote Flat
Poso
Los Mogotes
Big Horn Creek
Twin Lakes
Pinon
Kiowa Hill
Klondyke

TABLE VIII-15. SUMMARY OF RANGE IMPROVEMENTS AND RESULTANT DISTURBANCES

Range Improvement	Unit	Total	Total Acres Disturbed Short-Term	Total Acres Disturbed Long-Term
Water Developments				
Wells	No.	20	4.0	2.0
Springs	No.	26	5.2	5.2
Catchments	No.	5	2.5	1.0
Pipelines	Miles	147.52	29.5	
Easements	Miles	2.0		
Storage Tanks	No.	19	3.8	3.8
Water Troughs	No.	201	40.2	40.2
Reservoirs	No.	45	4-9	4-9
Fences				
Electric	Miles	6.5	3.3	0.7
New	Miles	233.54	116.8	23.4
Easements	Miles	0.5		
Removal	Miles	4.38	4.4	
Repair	Miles	11.75	1.2	1.2
Boundary Markers	No.	1,666	166.6	
Cattleguards	No.	18	1.8	1.8
Check Dams	No.	46	4-9	4-9
			397	97

Soils

With this alternative, 447,266 acres of NRL would be grazed only during the fall and winter. The effects on soil from grazing during the fall and winter were discussed in Chapter III (p. III-2 f.) and, as stated, there would be a decrease in erosion rates.

The total soil loss that would occur as a result of the implementation of range improvements is 9,310 tons.

Water

Eighty-three AMPs containing 447,266 acres of NRL would have fall and winter grazing only. Grazing during the fall and winter when the ground is frozen or semifrozen has little or no effect on soil infiltration rates. With increases in ground cover and no decreases in the infiltration rates, overland flow and sediment yields would decrease, resulting in a reduction in erosion rates on the fall and winter grazed AMPs. This would result in a decrease of 25,829 tons of sediment per year.

Twelve AMPs (26,651 acres NRL) with spring-summer grazing periods would be expected to have stabilized or improved hydrologic condition, even during the 50-year storm event, due to nature of the soils (coarse to cobbly).

Sediment yields on the remaining 42,455 acres would be same as the Proposed Action.

Water quality would improve as a result of reduced overland flow and reduced sediment yields.

Vegetation

All plants would benefit from complete rest from livestock grazing during their critical growth periods (spring and summer). This benefit would be offset if the grazing utilization during the fall and winter exceeded 65 percent. Heavy utilization would be expected to occur with woody plants (browse), especially during severe winters since the grass species would be covered by snow. Another reason that browse would be grazed more heavily is that it has higher protein contents during the dormant period than grass species.

Over the long term, this alternative would gradually result in grass species becoming the dominant forage species throughout the resource area. Changes in range condition (by 2005) with this alternative would be similar to changes resulting from the Proposed Action.

Wildlife

The competition created by fall-winter livestock grazing would effectively decrease the usable big-game forage. Nearly all the allotments proposed to be converted from spring-summer to fall-winter grazing are within crucial winter ranges for big game as identified in the San Luis Unit Resource Analysis. Table VIII-16 lists the projected reductions in big game forage and herd population expected to occur by 2005 if all grazing were changed to fall-winter use.

Aquatic and Riparian Communities

By changing the season of use to fall-winter, the result would be increased use on woody riparian vegetation. The woody plants associated with riparian vegetation are essential for a satisfactory riparian and aquatic community. The condition of these communities would be expected to continue to decline.

TABLE VIII-16. PROJECTED CUMULATIVE IMPACTS ON BIG-GAME POPULATIONS BY 2005 THROUGH CHANGING ALL LIVESTOCK GRAZING TO FALL-WINTER

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL Change %		Population after Change
			%	No.	
Mule Deer	4,500	-15%	-25%	-1,125	3,375
Elk	2,600	-10%	-20	-520	2,080
Antelope	1,145	-15%	-25	-286	859
Bighorn Sheep	250	-10%	-20	-50	200

*The maximum estimated population to use NRL at least part of each year

**Forage provided by NRL

SOURCE: Colorado Division of Wildlife Big-Game Harvest Statistics and Estimates by CDW and BLM personnel.

Land Use

Livestock Grazing

If the "watershed alternatives" were implemented, domestic livestock grazing on NRL would total 34,626 AUMs annually, just as with the Proposed Action. Reductions in qualifications, etc., would also total 2,450 AUMs. Thus, annual use levels upon implementation and projected future forage availability (53,557 AUMs) would be the same as with the Proposed Action.

As the description of this alternative indicates, all spring and summer grazing on 50 proposed AMPs has been shifted to fall and winter use to reduce sediment yields. Though total use would not change, the change in season of use would cause some disruption in established operations for the 50 units involved.

For many operators, a reorganization of their operations would be possible. They would likely substitute private (owned or leased) range for NRL in the spring prior to moving up to national forest lands. For others who lack adequate additional private range, this alternative would impose a severe impact. In the absence of suitable alternatives, they would, in essence, no longer have available forage for that period in spring between the time they usually leave their private lands and the time they move onto national forest lands.

Thus, some disruption would occur with a reorganization of affected ranches required. Since total use would not differ from the Proposed

Action, additional forage would be available in the fall or winter. Whether or not this late season use would compensate for lost spring-summer grazing is not known. For operators with sheep, the impact would likely not be as adverse as for those having cattle. On allotments at higher elevations, snow accumulation may prevent use some years.

In summary, the net impacts appear to be negative, even though many operators could make adjustments. For others, constraints on availability of private range, location or elevation of the allotments, and a lack of compatibility of their livestock with the fall-winter conditions would inflict hardships.

Socio-Economic Conditions

Population

This alternative is so similar to the Proposed Action in terms of domestic livestock grazing use that the population impacts are the same. Thus, it would tend to stabilize population levels but is not expected to influence ongoing regional population trends.

Income

Range Livestock Income

As noted earlier, the impacts would be the same as with the Proposed Action. Actual use would increase by about 2,000 AUMs, yielding a direct range livestock income increase of $3,120 and a total direct and indirect income increase of $4,789.

Over the longer term, projected availability of forage would increase by about 20,558 AUMs annually, yielding a direct annual effect of $30,837 and a total direct and indirect increase of $47,335 annually.

Contract Construction-Related Income

Under this alternative, construction costs would total $1,451,470 over the implementation period. Annual distribution of these costs would be similar to the Proposed Action. An estimated 20 percent of these costs would be retained by region households as income, generating $290,294 dollars in income over an eight-year period. This impact is positive but, regionally, relatively small, as noted in the Proposed Action.

Annual operation and maintenance costs would total an estimated $68,821. If 30 percent of these more labor-intensive costs are captured as local income, they will add $20,646 to regional income annually.

As with the Proposed Action, both positive and negative impacts would occur. The laborers and ranch hands receiving the maintenance income would view it as a positive impact. If ranch operators are required to pay for or do the maintenance work, it will be an adverse impact to them, since the grazing benefits are not increased proportionately with maintenance costs.

Recreation-Related Income

This alternative involves shifting all grazing use to the fall and winter seasons, thus putting domestic livestock in direct conflict with wildlife use of critical winter habitat.

This proposal would therefore reduce regional big game populations by 17.31 percent for mule deer, 10.83 percent for elk, 23.41 percent for antelope, and 16.67 percent for bighorn sheep.

Multiplying these population decreases by the expenditures for specific species estimated in the Colorado State University Study, regional annual expenditures by sportsmen would be reduced by $658,884. Assuming that about 20 percent of these expenditures become regional income, the loss of income would be an estimated $131,777 annually.

Other Income Effects

As with the Proposed Action, six additional BLM employees would be added to supervise the installation, operation and maintenance of improvements and management systems as well as to check for trespass violations, etc. Their salaries would generate an estimated additional $70,000 in income, of which $46,800 would be to employees living in Alamosa. This impact could be viewed as positive to the San Luis Valley region but might generally be viewed as a negative impact by many taxpayers.

In summary, the short-term increase in total range livestock related income ($4,789) would expand to an estimated $47,335 annually over the longer run. The initial construction related income of about $290,294 occurring over the eight-year implementation period would level out at $20,646 annually for ongoing maintenance related income. Regionally, recreation-related income would decrease by $131,777 annually, with government income increasing by a total of about $70,000. Thus, the net regional long-term effect on incomes would essentially be zero since the expected losses are approximately equal to the combined increases.

Employment

Based on the analysis of income effect, it appears that about 11 man years of recreation-related employment would be lost.

The increase in range livestock related income would likely not mean additional employment other than the increased maintenance requirements of 1.7 man years annually. Actually, as ranchers experience some economies of scale, they would likely provide only additional part-time employment for existing ranch hands and laborers. The six additional government employees would represent new employment.

In summary, the real effect would likely be a decrease in employment in the San Luis Valley by about 3 man years.

Social Well Being

The previous discussion indicates that the impact on social well being would be slightly negative. As that discussion indicates, there would be both gains and losses, but the net effect appears slightly negative and would contribute to an already substantial problem.

Socio-Cultural Attitudes

This proposal would stimulate the region's livestock sector but would decrease wildlife populations and thus would not be in harmony with stimulation of the region's economy.

Further, the imposition of fall-winter only grazing use would be more restrictive and disruptive to livestock operators than the Proposed Action.

Other local, regional and national groups would likely find the impact on wildlife unacceptable and, in this case, "environmental" groups and interests would join with local ranchers in opposing the alternative. Local-regional-national debate and resulting political pressures would preclude the actual implementation of this alternative, since it fails to meet the values and goals held by a wide array of interests.

Other Social Support Facilities and Services

This alternative is not expected to have measurable impacts on social support facilities and services such as schools, health, police, fire, and the like.

As with the Proposed Action, the reduction being imposed would reduce property values by about $204,170 and assessed valuation by about $61,251.

Yet the long-term increases in productivity imply that base property values would increase by $1,546,500 and assessed valuation would increase by $463,950. Since no commitment regarding allocation of increased forage is being made and the increased assessed valuation is only about 0.23 percent of the 1974 base, the impact cannot be deemed significant.

Alternative G: Balanced Multiple Use

Description

This selective management alternative was developed after giving balanced consideration to such factors as economic costs and benefits, watershed improvement, wildlife enhancement, and grazing (including user concern), as were identified in the Proposed Action and Alternatives A through F. Table VIII-17 identifies combinations of the Proposed Action and Alternatives which make up this "multiple use" alternative.

The purpose of this alternative is to combine elements of the Proposed Action and Alternatives which would be expected to produce the most benefits while reducing adverse impacts of grazing management throughout the San Luis Resource Area. Total livestock grazing use would be 34,654 AUMs annually, and no commitments to future increases in grazing use have been made.

This alternative is composed of the following (see Table VIII-27):

1. Implement 55 AMPs and continue with 9 existing AMPs as described in the Proposed Action.

2. Implement 7 AMPs as revised for optimum wildlife (including 1 existing AMP--2E Arizona-Colorado).

3. Implement 12 AMPs as revised to reduce cost (2 AMPs as described in the Proposed Action were combined into 1 AMP--132P Four Mile and 137P Blanca).

4. Eliminate livestock grazing on 9 management units as described in the Proposed Action.

5. Implement custodial management on 39 management units as described in the Proposed Action, and implement custodial management on

TABLE VIII-17. BALANCED MULTIPLE USE: ALTERNATIVE G

MANAGEMENT UNIT NUMBER AND NAME 1/	SELECTED MANAGEMENT 2/		
	Proposed Action	Reduced Management	Wildlife Effectiveness
1P Poncha Pass West	AMP		
2E Poncha Pass East and East Side			Revised AMP
3C Round Hill	Custodial		
4P West Clover Creek		Custodial	
5C Clover Creek	Custodial		
6C San Luis Creek #1	Custodial		
7P Alder		Custodial	
8C San Luis Creek #2	Custodial		
9E Turquoise Gulch	AMP		
10E Kelly Creek	AMP		
11P Kerber Creek	AMP		
12C South Kerber Creek	Custodial		
13C North Kerber Creek	Custodial		
14E Noland Gulch	AMP		
15P Nye		Custodial	
16P East & West San Luis Creek		Revised AMP	
17C Section 35 Tract	Custodial		
18C Junction	Custodial		
19C Section 13 Tract	Custodial		
20U Unallotted	Unallotted		
21C Silver Creek F.R.	Custodial		
22P Piney Creek	AMP		
23P Steel Canyon	AMP		
24P Mirage	AMP		
25E Valley View Hot Springs	AMP		
26Eg Garner Creek)			
27Eg South)	Elimination		
28P Cotton Creek	AMP		
29C Noland Gulch	Custodial		
30C South Kerber Creek	Custodial		
31P Hutchinson			Revised AMP
32U Unallotted	Unallotted		
33U Unallotted	Unallotted		
34P Mineral Hot Springs	AMP		
35U Unallotted	Unallotted		
36P McIntyre Gulch	AMP		
37U Unallotted	Unallotted		
38U Unallotted	Unallotted		
39U Findley Gulch		Revised AMP	
40C Calvert Fenced F.R.	Custodial		
41P Laughlin Gulch	AMP		
42P Poison Gulch			Revised AMP
43C Ward Fenced Tracts	Custodial		
44C Indian Creek	Custodial		
45P Cross Creek	AMP		
46P Trickle Mountain	AMP		
47P Sheep Creek	AMP		
48P Taylor Canyon	AMP		
49C Meadow Fenced F.R.	Custodial		
50P Rabbit Canyon	AMP		

1/ Key to type of proposed component indicated in management unit number:
E = Existing intensive management of grazing (AMP)
P = Proposed intensive management of grazing (AMP)
C = Custodial Management
U = Unallotted
Eg = Elimination of grazing

2/ This alternative--Balanced Multiple Use--was developed after analyses of the Proposed Action and Alternatives to provide for a grazing management program which would produce the most benefits while reducing adverse impacts.

* 132P Four Mile and 137P Blanca Allotment combined

TABLE VIII-17. BALANCED MULTIPLE USE: ALTERNATIVE G

MANAGEMENT UNIT NUMBER AND NAME 1/	SELECTED MANAGEMENT 2/ Proposed Action	Reduced Management	Wildlife Effectiveness
51E Saguache Parl (USFS-BLM)	AMP		
52P Hat Springs	AMP		
53P Robb Ranch	AMP		
54C Mesa	Custodial		
55P Mill Hill	AMP		
56P Higgins Spring		Custodial	
57P Mitchell	AMP		
58P West Tracy Ridge	AMP		
59P Tracy Ridge		Custodial	
60P Tracy Cattlemen's			Revised AMP
61P Tracy Individual	AMP		
62U Unallotted	Unallotted		
63P Biedell Creek	AMP		
64P East of Carnero Creek	AMP		
65P Upper Coolbroth	AMP		
66P Lower Coolbroth	AMP		
67P Carnero Creek			Revised AMP
68P La Garita			Revised AMP
69P Elephant Rocks	AMP		
70P Rio Grande Canal	AMP		
71C Indian Head	Custodial		
72C County Line	Custodial		
73P Alder Creek	AMP		
74Eg Masonic Park	Elimination		
75C Show Creek	Custodial		
76P Sanderson	AMP		
77P Bowen	AMP		
78P Schrader Creek		Custodial	
79P Branch	AMP		
80P Pup Peak	AMP		
81P Limekiln		Revised AMP	
82P Nicomodes		Revised AMP	
83P Raton Creek		Revised AMP	
84P Rock Creek	AMP		
85P McMahon	AMP		
86P Greenie Mountain	AMP		
87P Gato-Hutchinson	AMP		
88P Alamosa River		Custodial	
90C Alamosa Prairie	Custodial		
91U Unallotted	Unallotted		
92C Chicago Bogs	Custodial		
93P Posito Creek	AMP		
94P Jadero Flat	AMP		
95P Poso Creek	AMP		
96P Capulin		Revised AMP	
97P Romero Canyon	AMP		
98P Ra Jadero Canyon	AMP		
99P Cinder Pits	AMP		
100E Ciscom Flat	AMP		
101E Hot Creek	Unallotted		
102P La Jara Creek	AMP		
103C Del Rancho	Custodial		
104Eg La Jara Canyon	Elimination		
105Eg Pastures	Elimination		
106P Little Mogotes	AMP		
107P Grande	AMP		

TABLE VIII-17. BALANCED MULTIPLE USE: ALTERNATIVE G

MANAGEMENT UNIT NUMBER AND NAME 1/	SELECTED MANAGEMENT 2/		
	Proposed Action	Reduced Management	Wildlife Effectiveness
108P Mogote Flat	AMP		
109P Poso		Revised AMP	
110P Los Mogotes	AMP		
111P Big Horn (Creek)			Revised AMP
112P Railroad	AMP		
113P Llano	AMP		
114U Unallotted	Unallotted		
115P Alta Lake		Revised AMP	
116E Twin Lakes	AMP		
117P River		Custodial	
118Eg Mondragon Individual	Elimination		
119P South Valley		Custodial	
120P Pinon		Custodial	
121E Kiowa Hill	AMP		
122P Braiden		Custodial	
123P Eight Mile		Revised AMP	
124P Pinon Hills	AMP		
125P Rio Grande Common		Revised AMP	
126P La Sauses		Revised AMP	
127Eg Saddleback Mountain	Elimination		
128C Oxbow	Custodial		
129P Rio Grande		Custodial	
130C Allotment 3	Custodial		
131U Emperius	Unallotted		
132P Four Mile		Revised AMP*	
133P Tobin Creek	AMP		
134P Foothills	AMP		
135C Dow Pasture	Custodial		
136C Phiffer Pasture	Custodial		
137P Blanca Allotment		Revised AMP*	
138P Dry Lakes	AMP		
139C Caldwell Pasture	Custodial		
140Eg Park Pasture	Elimination		
141P Zapata Falls	AMP		
142C Bachelor Lake	Custodial		
143C Spring Pasture	Custodial		
144C Sand Pasture	Custodial		
145C Crow Pasture	Custodial		
146C Section 15 Lease	Custodial		
147C Section 15 Lease	Custodial		
148Eg North Pasture	Elimination		
149U Unallotted	Unallotted		
150C Dry Lakes	Custodial		
151U Unallotted	Unallotted		
152U Unallotted	Unallotted		
153U Unallotted	Unallotted		
154U Unallotted	Unallotted		
155U Unallotted	Unallotted		
156U Unallotted	Unallotted		
157U Unallotted	Unallotted		
158U Unallotted	Unallotted		
159E Klondyke (USFS-BLM)	AMP		
160C Phone Line	Custodial		
161C Big East	Custodial		
162C Hellgate	Custodial		
163C Steep Trail	Custodial		
164U Terrace Lakes	Unallotted		
165U Bonanza	Unallotted		

12 additional management units, 21,284 acres of NRL, which had AMPs proposed but were not economically viable (season of use, class, and number of livestock would be established for these 12 management units).

6. Continue the unallotted status on 22 management units as described in the Proposed Action.

While this alternative does not maximize positive effects for any one resource--water, soil, vegetation, or wildlife--it does provide a balanced approach to resource management following a multiple use concept.

The following range improvements would be constructed with implementation of this alternative:

Range Improvement	Unit	Total
Water Developments		
Wells	No.	15
Springs	No.	25
Catchments	No.	6
Pipelines	Miles	107.12
Easements	Miles	1.25
Storage Tanks	No.	15
Water Troughs	No.	149
Reservoirs	No.	40
Fences		
New	Miles	222.63
Easements	Miles	0.5
Removal	Miles	.38
Repair	Miles	11.75
Boundary Markers	No.	2006
Cattleguards	No.	19
Check Dams	No.	33

Table VIII-18 shows by management unit the schedule of implementation for the AMPs and elimination of grazing.

TABLE VIII-18. SCHEDULE FOR IMPLEMENTING ALLOTMENT MANAGEMENT PLANS AND ELIMINATION OF GRAZING*

Year 1		Year 2		Year 3		Year 4	
1P	Poncha Pass West	2E	Arizona Colorado	36P	McIntyre Gulch	39P	Findley Gulch
26Eg	Garner Creek**	28P	Cotton Creek	55P	Mill Hill	45P	Cross Creek
27Eg	South**	47P	Sheep Creek	74Eg	Masonic Park	46P	Trickle Mountain
57P	Mitchell	63P	Biedell Creek	80P	Pup Peak	50P	Rabbit Canyon
58P	West Tracy Ridge	76P	Sanderson	81P	Limekiln	64P	E. of Carnero Creek
66P	Lower Coolbroth	87P	Gato-Hutchinson	84P	Rock Creek	70P	Rio Grande Canal
77P	Bowen	88P	Triangle	97P	Romero Canyon	86P	Greenie Mountain
94P	Jadero Flat	102P	La Jara Creek	98P	Ra Jadero Canyon	108P	Mogote Flat
105Eg	Pastures	104Eg	La Jara Canyon	99P	Cinder Pits	110P	Los Mogotes
111P	Big Horn Creek	112P	Railroad	106P	Little Mogotes	133P	Tobin Creek
113P	Llano	118Eg	Mondragon**	127Eg	Saddleback	138P	Dry Lakes
(132P	Four Mile)					140Eg	Park Pasture**
(137P	Blanca) Combined						

Year 5		Year 6		Year 7		Year 8	
16P	East & West San Luis Creek	22P	Piney Creek	11P	Kerber Creek	53P	Robb Ranch
42P	Poison Gulch	23P	Steel Canyon	41P	Laughlin Gulch	67P	Carnero Creek
65P	Upper Coolbroth	24P	Mirage	48P	Raylor Canyon	68P	La Garita
69P	Elephant Rocks	31P	Hutchinson	52P	Hat Springs	79P	Branch
82P	Nicomodes	34P	Mineral Hot Springs	61P	Tracy Individual	93P	Posito Creek
96P	Capulin	60P	Tracy Cattlemen's	73P	Alder Creek	141P	Zapata Falls
109P	Poso	107P	Grande	83P	Raton Creek		
115P	Alta Lake	123P	Eight Mile	85P	McMahon		
125P	Rio Grande Common	124P	Pinon Hills	95P	Poso Creek		
126P	La Sauses						

* P = Proposed AMP, Eg = Elimination of Grazing

** Allotments require fencing in order to eliminate livestock grazing

Soils

The impacts on soils from this alternative would be similar to those of the Proposed Action except for the season of use change from fall-winter to spring-summer on the Carnero (67P), La Garita (68P), and Hutchinson (31P) AMPs.

Summer grazing on the Hutchinson (31P) AMP would not affect the soil infiltration rate since the soils of this unit are coarse textured.

There would be a decrease in soil infiltration rates by a change in season of use on the Carnero (67P) and La Garita (68P) AMPs from winter to summer grazing, but since these are small AMPs (3,400 acres NRL), this decrease will have an insignificant effect upon the erosion rate.

The soil loss resulting from the construction of range improvements would be 9,132 tons.

Water

Three allotments, Hutchinson (31P), Carnero Creek (67P), and La Garita (68P) would be changed from fall-winter to spring-summer grazing. The coarse soils in Hutchinson would be unaffected by spring or summer use.

The infiltration rates would be expected to decrease on the Carnero Creek (67P) and La Garita (68P) AMPs as a result of summer grazing. Runoff and peak discharge would increase during a 50-year storm event. Sediment yields would increase 3 to 5 percent (62 to 104 tons) on these allotments.

On the 12 additional custodial managed units, the sediment yield would remain unchanged from the present rate (0.3 to 1.2 tons per year). An estimated 259 to 440 tons less sediment would be produced during the 50-year storm since livestock would not be concentrated on the 12 custodial managed units with this alternative.

Sediment yields on the remaining 151 management units would be unchanged from the Proposed Action.

With this alternative, the sediment yield increases would be 4,986 to 8,311 tons during the 50-year storm, while 5,183 to 8,647 ton increases would be expected during a 50-year storm with the Proposed Action.

Sediment yields as a result of this alternative would decrease an estimated 8,614 tons annually. This decrease is 1,336 tons fewer than the expected decreases in annual sediment yield resulting from the Proposed Action.

Vegetation

The fencing and planting of woody vegetation on approximately 7 miles of San Luis Creek, Fisher Creek, and Ford Creek within the Arizona-Colorado (2E) and Poison Gulch (42P) AMPs would improve vegetative condition on an estimated 20 acres. This improvement would consist of an increase in woody vegetation such as willows, alder, aspen, and cottonwood. Herbaceous plants such as tufted hairgrass, reedgrasses, mannagrasses, bluegrasses, wildryes, rushes, sedge, bluebells, and numerous forbs would increase.

The elimination of fall-winter grazing proposed on the Hutchinson (31P), Tracy Cattlemen's (60P), Carnero Creek (67P), La Garita (68P), and Big Horn Creek (111P) allotments would change 741 AUMs of livestock grazing on NRL to the summer season. Browse species such as winterfat, fourwing saltbush, mountain mahogany, and rabbitbrush would be expected to increase.

An estimated 394.04 acres of short-term disturbance to vegetation would result from construction of range improvements, and 80.9 acres would be permanently removed from production with this alternative.

Custodial management on the 12 management units which had been proposed for AMPs would result in little change from the existing vegetative conditions and production.

Range conditions of NRL by 2005 as a result of this alternative would be as follows: good, 229,184 acres; fair, 155,496 acres; and poor, 89,236 acres.

Wildlife

The impacts on wildlife from this alternative would be similar to those of the Proposed Action in most regards with slight variations in the projected deer and antelope forage (see Table VIII-19).

Mule deer forage would be expected to increase by about 22 percent (2 percent greater than in the Proposed Action); this would result in a net population gain of 6 percent as compared to 5 percent in the

TABLE VIII-19, PROJECTED CUMULATIVE IMPACTS OF ALTERNATIVE G BALANCED MULTIPLE USE ON BIG-GAME POPULATIONS IN THE SAN LUIS RESOURCE AREA BY 2005

Species	Present Population*	Projected Change NRL Forage**	Projected Population, NRL Change %	Projected Population, NRL Change No.	Projected Population, NRL Population after Change
Mule Deer	4,500	+22%	+6%	+270	4,770
Elk	2,600	+20%	+5%	+130	2,730
Antelope	1,145	+20%	+15%	+172	1,317
Bighorn Sheep	250	+30%	+20%	+50	300

*The maximum estimated population to use NRL at least part of each year.

**Forage provided by NRL.

SOURCE: Population estimates derived from Colorado Division of Wildlife Big Game Harvest Statistics and estimates by CDW and BLM personnel. Projections by BLM personnel.

Proposed Action. This variance is due to the selection of several wildlife-effective AMPs which will reduce livestock-deer competition slightly. These include the Hutchinson (31P), Tracy Cattlemen's (60P), Carnero Creek (67P), La Garita (68P), and Bighorn Creek (112P) allotments.

A 20 percent increase in usable antelope forage would result in a net population gain of 15 percent. Antelope movement would not improve on Nye, Alta Lake, Eight Mile and La Sauses Allotments (21,746 acres of NRL) since fence modifications would not be made part of the AMP implementation.

A total of 204 water sources would be created in this alternative, which is less than in the Proposed Action.

Aquatic and Riparian Communities

The impacts of this alternative on aquatic and riparian habitat would be similar to those of the Proposed Action with the following exception: a total of 3.5 miles of riparian habitat would improve to good or excellent condition in the Arizona-Colorado (1.0 mi.) and Poison Gulch 2.5 mi.) allotments due to stream-bottom fencing and planting of woody vegetation.

Land Use

Recreation

This alternative would have the same impacts as the Proposed Action for visitors engaged in driving for pleasure, fishing, and snowmobiling.

Impacts would be the same as those described for the Proposed Action for visitors engaged in hiking, pinon nut collecting, hunting, off-road vehicle use, four-wheel drive use, and motorcycle use. The impact, however, would be less significant due to 62.21 miles less fencing proposed in this alternative than in the Proposed Action.

Livestock Grazing

Upon full implementation of this alternative, grazing use would be 34,654 AUMs annually. A reduction in active qualifications of 2,450 AUMs annually would apply here as in the Proposed Action.

Use would be 345 AUMs fewer than current licensed use, and 28 AUMs more annually, than with the Proposed Action. These changes are too small to represent a significant short-term departure from the Proposed Action.

Over the longer run, projected availability would total an estimated 52,422 AUMs (see Table VIII-20) available for domestic livestock. This total is 1,135 AUMs fewer than the similar projection for the Proposed Action and reflects the long-term effects of less intensive management on 12 additional allotments which in this alternative would receive custodial management. Likewise, the 12 units having revised AMPs because of benefit/cost considerations would likely not achieve the expected productivity estimated in the Proposed Action.

TABLE VIII-20. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/	Alternative G Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
1P Poncha Pass West		555	375	500	1,603
2E Poncha Pass East (and)	Revised AMP	380	372	) 534	
East Side		1,874	1,875	) 2,466	7,003
3C Round Hill		10	10	10	**
4P West Clover Creek	Custodial	57	45	45	138
5C Clover Creek		5	5	5	**
6C San Luis Creek #1		6	6	6	**
7P Alder	Custodial	133	132	133	949
8C San Luis Creek #2		12	12	12	**
9E Turquoise Gulch		539	539	960	1,734
10E Kelly Creek		566	566	900	2,460
11P Kerber Creek		274	274	500	1,778
12C South Kerber Creek		12	12	12	**
13C North Kerber Creek		18	18	18	**
14E Noland Gulch		541	541	900	1,932
15P Nye	Custodial	90	50	50	476
16P East & West San Luis Creek	Revised AMP	272	262	420	853
17C Section 35 Tract		18	20	20	**
18C Junction		20	20	20	**
19C Section 13 Tract		12	12	12	**
20U Unallotted		--	--	--	**
21C Silver Creek F.R.		8	8	8	**
22P Piney Creek		180	171	450	629
23P Steel Canyon		210	210	500	1,120
24P Mirage		187	187	300	813
25E Valley View Hot Springs		427	427	600	1,642
26Eg Garner Creek)					**
27Eg South)		30	None	None	**
28P Cotton Creek		312	312	550	1,476
29C Noland Gulch		45	45	45	**
30C South Kerber Creek		12	12	12	**
31P Hutchinson	Revised AMP	79	77	100	362
32U Unallotted		--	--	--	**
33U Unallotted		--	--	--	**
34P Mineral Hot Springs		744	1,030	1,450	4,061
35U Unallotted		--	--	--	**

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a/ Key to type of proposed component indicated in management unit number:
E = Existing intensive management of grazing (AMP)
P = Proposed intensive mangement of grazing (AMP)
Eg = Elimination of grazing
C = Custodial management of grazing
U = Unallotted status of range

b/ 1975 Licensed Use

c/ Average annual use. AUMs from proposed action

d/ Although production is expected to increase to the amounts shown in this column, BLM would not be committed to any additional livestock use

e/ Potential productivity for all animals (livestock and wildlife) in AUMs

* Denotes average annual use from AMPs which include years of non-use or varying use levels

** Potential productivity of soils was determined only for the intensive management units

*** 132P Four Mile and 137P Blanca were combined

TABLE VIII-20. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/		Alternative G Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
36P	McIntyre Gulch		311	311	550	1,542
37U	Unallotted		--	--	--	**
38U	Unallotted		--	--	--	**
39P	Findley Gulch	Revised AMP	1,127	753	1,050	4,116
40C	Calvert Fenced F.R.		14	14	14	**
41P	Laughlin Gulch		453	453	800	2,797
42P	Poison Gulch	Revised AMP	884	943	1,500	6,742
43C	Ward Fenced Tracts		18	18	18	**
44C	Indian Creek		7	7	7	**
45P	Cross Creek		300	301	650	2,811
46P	Trickle Mountain		1,195	776	1,800	8,390
47P	Sheep Creek		210	159*	250	1,075
48P	Taylor Canyon		245	245	320	1,536
49C	Meadow Fenced F.R.		20	20	20	**
50P	Rabbit Canyon		289	292	350	1,612
51E	Saguache Park USFS-BLM		119	119	200	900
52P	Hat Springs		323	323	410	1,714
53P	Robb Ranch		113	113	160	827
54C	Mesa		20	20	20	**
55P	Mill Hill		263	263	410	2,248
56P	Higgins Spring	Custodial	49	49	50	204
57P	Mitchell		51	25	50	232
58P	West Tracy Ridge		50	15	50	260
59P	Tracy Ridge	Custodial	44	45	70	350
60P	Tracy Cattlemen's		2,842	2,847	3,350	9,958
61P	Tracy Individual		99	100	180	1,397
62U	Unallotted		--	--	--	**
63P	Biedell Creek		172	172	250	1,241
64P	East of Carnero Creek		620	630	1,200	4,810
65P	Upper Coolbroth		118	74	140	557
66P	Lower Coolbroth		58	29	60	257
67P	Carnero Creek	Revised AMP	Non-use	104	240	465
68P	La Garita	Revised AMP	Non-use	73	120	539
69P	Elephant Rocks		200	93	250	1,036
70P	Rio Grande Canal		Non-use	225	300	1,302
71C	Indian Head		28	28	28	**
72C	County Line		18	18	18	**
73P	Alder Creek		20	13*	30	56
74Eg	Masonic Park		22	None	None	**
75C	Show Creek		44	44	44	**
76P	Sanderson		32	21*	21	202
77P	Bowen		32	21	50	117
78P	Schrader Creek	Custodial	Non-use	42	45	183
79P	Branch		Non-use	95*	180	536
80P	Pup Peak		404	404	500	1,977
81P	Limekiln	Revised AMP	370	370	500	1,487
82P	Nicomodes	Revised AMP	303	304	340	968

TABLE VIII-20. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/	Alternative G Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
83P Raton Creek	Revised AMP	384	386	400	1,446
84P Rock Creek		1,147	1,147	1,440	5,323
85P McMahon		1,310	1,287	1,550	8,983
86P Greenie Mountain		128	598	700	2,495
87P Gato-Hutchinson		228	228	270	908
88P Triangle		315	210*	420	1,925
89P Alamosa River	Custodial	40	40	40	234
90C Alamosa Prairie		11	11	11	**
91U Unallotted		--	--	--	**
92C Chicago Bogs		52	52	52	**
93P Posito Creek		218*	350	550	5,912
94P Jadero Flat		323	322	580	5,361
95P Poso Creek		206	206	260	684
96P Capulin	Revised AMP	587	588	620	1,708
97P Romero Canyon		114	127	200	2,307
98P Ra Jadero Canyon		711	621	800	8,974
99P Cinder Pits		1,179	1,160	1,850	5,497
100E Ciscom Flat		192	192	400	1,143
101U Hot Creek		--	--	--	**
102P La Jara Creek		Non-use	30*	60	204
103C Del Rancho		12	12	12	**
104Eg La Jara Canyon		18	None	None	**
105Eg Pastures		21	None	None	**
106P Little Mogotes		1,169	1,444	1,700	5,983
107P Grande		443	436	520	4,367
108P Mogota Flat		206	206	280	1,131
109P Poso	Revised AMP	315	276	520	1,819
110P Los Mogotes		507	652	800	4,834
111P Big Horn (Creek)	Revised AMP	90	59*	100	435
112P Railroad		210	159	400	1,838
113P Llano		187	150	500	2,095
114U Unallotted		--	--	--	**
115P Alta Lake	Revised AMP	711	575	1,200	3,714
116E Twin Lakes		653	653	900	2,491
117P River	Custodial	200	200	200	710
118Eg Mondragon Individual		4	None	None	**
119P South Valley	Custodial	139	136	140	596
120P Pinon	Custodial	392	393	400	2,058
121E Kiowa Hill		208	208	430	1,501
122P Braiden	Custodial	60	60	60	294
123P Eight Mile	Revised AMP	238	212	520	1,604
124P Pinon Hills		538	391	660	2,450
125P Rio Grande Common	Revised	860	838	1,550	4,775

TABLE VIII-20. LIVESTOCK GRAZING ANALYSIS

Management Unit Number and Name a/		Alternative G Management Changes	Present Use b/ AUMs	Proposed Use c/ AUMs	Projected AUM Availaility d/ in 2005	Potential Productivity e/ AUMs
126P	La Sauses	Revised AMP	141	128	260	822
127Eg	Saddleback Mountain		32	None	None	**
128C	Oxbow		8	8	8	**
129P	Rio Grande	Custodial	103	98	150	1,488
130C	Allotment B		3	3	3	**
131U	Emperius		--	--	--	**
132P	Four Mile	Revised AMP***	Non-use	7*	30	116
133P	Tobin Creek		235	235	600	2,641
134P	Foothills		279	257	500	2,065
135C	Dow Pasture		14	14	14	**
136C	Phiffer Pasture		4	4	4	**
137P	Blanca Allotment	Revised AMP***	36	28*	530	1,900
138P	Dry Lakes		139	139	580	2,125
139C	Caldwell Pasture		13	13	13	**
140Eg	Park Pasture		12	None	None	**
141P	Zapata Falls		244	245	480	2,231
142C	Bachelor Lake		24	24	24	**
143C	Spring Pasture		10	10	10	**
144C	Sand Pasture		10	10	10	**
145C	Crow Pasture		40	40	40	**
146C	Section 15 Lease		8	8	8	**
147C	Section 15 Lease		7	7	7	**
148Eg	North Pasture		40**	--	--	**
149U	Unallotted		--	--	--	**
150C	Dry Lakes		4	4	4	**
151U	Unallotted		--	--	--	**
152U	Unallotted		--	--	--	**
153U	Unallotted		--	--	--	**
154U	Unallotted		--	--	--	**
155U	Unallotted		--	--	--	**
156U	Unallotted		--	--	--	**
157U	Unallotted		--	--	--	**
158U	Unallotted		--	--	--	**
159E	Klondyke (USFS-BLM)		47	47	120	273
160C	Phone Line		24	24	24	**
161C	Big East		40	40	40	**
162C	Hellgate		29	29	29	**
163C	Sheep Trail		11	11	11	**
164U	Terrace Lakes		--	--	--	**
165U	Bonanza		--	--	--	**
Totals			34,999	34,654	52,422	208,442

Increased "Wildlife Effectiveness" was achieved primarily by fencing portions of streams and by changing season of use from fall-winter to spring-summer to reduce conflicts in critical winter habitat areas. Thus, net beneficial wildlife impacts were achieved without loss of forage to domestic livestock.

Though projected future forage availability is slightly less than with the Proposed Action (1,135 AUMs annually), annual future availability is expected to be 17,425 AUMs greater than current license levels.

The livestock industry would be stabilized, and although projected availability in excess of implementation levels is not committed to users, the projected forage availability represents an increase of about 50 percent over current licensed use levels.

Aesthetics

The resulting visual impacts would be identical to those described in the Reduced Management Alternative with one exception: an additional spring will be constructed on the West Tracy Ridge Allotment.

Socio-Economic Conditions

Population

The implementation of this alternative would likely not influence ongoing regional population trends or levels. This alternative would tend to stabilize the range livestock industry and could potentially increase domestic livestock use of NRL. These effects would not likely cause measurable population impacts.

Income

Range Livestock Related Income

Upon full implementation of this proposal, actual average use would increase by about 2,000 AUMs annually generating a direct range livestock income effect of $3,120 and a total direct and indirect effect of about $4,789. This is a positive but regionally insignificant impact, as noted in the Proposed Action.

Over the longer term, projected availability of forage for domestic livestock would increase by 17,423 AUMs annually over current licensed levels. This represents a total long-term increase of about 19,423 AUMs if the increased forage was allocated to users. The direct impact would be about $30,300 with a total annual direct and indirect impact of about $46,510 (1970 dollars).

Contract Construction Related Income

The improvements associated with this alternative would cost an estimated $1,228,250 to purchase and install. If 20 percent of this amount is captured by local households as income, the regional income effect would be $245,650 over the eight-year implementation period. Annual distribution would be similar to the Proposed Action, even though the annual and gross totals are somewhat lower.

This would represent a beneficial impact on an area where incomes and wellbeing are far below state averages. To the extent that local contractors and laborers install the improvements, the local beneficial impacts would be increased.

Annual operation and maintenance costs would total an estimated $54,796. Assuming that this work is more labor-intensive, an estimated 30 percent of these costs, or $16,439, would be captured as local income. While this would represent an ongoing annual beneficial impact, it is likely that existing laborers and ranch hands would capture this income.

These maintenance costs would constitute an adverse impact on users (allottees) to the extent that their costs would disproportionately exceed the forage benefits, since many of the benefits consist of public goods, e.g., wildlife, that cannot be captured by ranch operators.

Recreation Related Income

The expected improvement in wildlife habitat will expand game herds, as shown in Table VIII-19 (p. VIII-104). Multiplying these increases times sportsmen's expenditures as indicated in the previously cited CSU study suggests that hunter expenditures in the region would increase by about $161,868 annually. Assuming again that local households capture about 20 percent of this amount as income suggests that regional incomes will increase by $32,374 annually.

Other Income Effects

As noted in the Proposed Action, BLM would add six additional employees to supervise the installation of improvements and maintenance as well as supervise the operation of the proposed management systems, in addition to checking for trespass violations.

The annual salaries of these employees would total an estimated $70,000, of which $46,800 would go to four new employees living in the Alamosa area. This income effect would likely be viewed as a beneficial impact by some and an adverse impact by others (taxpayers). It would also tend to increase the government sector in the regional economy.

In summary, the long-term annual income impact would be an increase in range livestock related income of $46,510 annually. Ongoing maintenance related income would add another $16,439, with recreation related income increased by $32,374 annually. Added government employment would increase incomes of about another $70,000,* of which $46,800 would go to employees living in the San Luis Valley.

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*Assumes an annual salary of $12,000 per year

Employment

The initial installation or construction of proposed improvements would generate an estimated 20.51 man years of employment during the implementation period. Annual maintenance expenditures would theoretically generate about 1.37 man years of employment. Recreation related income would also generate another 2.7 man years of employment annually, with government employment expanded by six man years annually.

Thus, ongoing expenditures and activities would expand employment by 9 or 10 jobs annually. The positive impact would likely be welcomed but is not large enough to have a significant or noticeable impact on the regional employment/unemployment situation.

Social Well-Being

The estimated increases in income and employment would generate positive impacts regarding social well-being. However, they are so small when compared with existing deficits and total regional income and employment that little would be changed. As with the Proposed Action, the alternative, if implemented, cannot be viewed as being an action that would change regional social well-being.

Socio-Cultural Attitudes

This alternative is very similar to the Proposed Action and would stimulate the region's economy, protect and enhance resource values, and stabilize or increase domestic livestock grazing on NRL. Thus, it is in harmony with some existing values and attitudes.

This alternative is somewhat less restrictive and less costly than the Proposed Action and is thus more likely to be acceptable to the region's residents.

Other regional national interest groups might find it somewhat unacceptable since it does not maximize the positive impacts on any individual resource.

Other Social Support Facilities and Services

This alternative is sufficiently similar to the Proposed Action in some respects that no measurable impacts on social support facilities and services is expected. This proposal would tend to stabilize and stimulate the regional economy and would thus tend to provide some measure of support to the current population income, employment and tax bases.

The reduction in active qualifications by 2,450 AUMs annually would translate into a loss of 204.17 animal units of carrying capacity for area ranchers. A theoretical loss of $204,170 in lease property values would occur, reducing the regional total assessed valuation by about $61,251, or 0.05 percent of the 1974 regional total.

Actually, however, projected availability of forage would increase by 17,423 AUMs annually over current license levels. If allocated to allottees, this would increase the carrying capacity of region ranches by 1451.92 animal units. This would increase ranch values by an estimated $1,451,917 and increase regional assessed valuation by $435,575--more than compensating for the theoretical loss noted above. This increase would amount to only 0.22 percent of the 1974 tax base.

CHAPTER IX. CONSULTATION AND COORDINATION

Team Organization

A team consisting of resource specialists from the BLM Colorado State Office and the BLM Canon City District was organized and first met on September 29, 1975 at Canon City. Two contracts were let to acquire data: water resources (Gifford, Hawkins, and Williams - Utah State University) and archaeology (Greiser - University of Colorado). Preliminary review of the statement was handled primarily through the BLM Denver Service Center.

Consultation and Coordination in the Preparation of the Draft Environmental Statement

News releases concerning AMP development and eventual environmental statement preparation were given to local and regional news media during August, 1975. County Commissioners of the four counties involved--Saguache, Alamosa, Rio Grande, and Conejos--were briefed of BLM plans at commission meetings during September and October. Other federal, state, and local agencies were notified by letter during September. Livestock operators were notified by letter and, when available, by personal contact during AMP preparation.

Informal, local-level contacts were made with various governmental agencies and individuals to acquire data used in this draft. Included were Adams State College, U.S. Soil Conservation Service, U.S. Forest Service, U.S. Geological Survey, and the Colorado Division of Wildlife.

Coordination in the Review of the Draft Environmental Statement

Comments on the draft environmental statement will be requested from the following agencies and interest groups.

Colorado State Agencies

- Governor's Clearing House
- Division of Wildlife

County Commissioners

- Alamosa County
- Conejos County
- Rio Grande County
- Saguache County

Environmental Protection Agency

Department of the Interior

- U.S. Fish and Wildlife Service
- Bureau of Reclamation
- Bureau of Outdoor Recreation
- U.S. Geological Survey
- Bureau of Mines
- National Park Service

Department of Agriculture

- Forest Service
- Soil Conservation Service

Department of Commerce

Other Organizations

- Sierra Club
- Colorado Open Space Council
- Izaak Walton League
- The Wildlife Society
- Colorado Stock Growers Association
- Colorado Wool Growers Association
- Audubon Society
- Natural Resources Defense Council
- Society of Range Management
- Wilderness Society
- Rocky Mountain Center on Environment
- Advisory Council on Historic Preservation
- Institute of Ecology

Copies of this draft environmental statement will be available for public inspection at the locations listed below.

Bureau of Land Management Offices:

Washington Office of Public Affairs
18th and C. Streets
Washington, D. C. 20240 Phone: (202)343-5717

Colorado State Public Affairs Office
Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80202 Phone: (303)837-4481

Canon City District Office
3080 East Main Street
Canon City, Colorado 81212 Phone: (303)275-7494

San Luis Resource Area Office
1921 State Street
Alamosa, Colorado 81101 Phone: (303)589-4975

A public hearing is planned to be held in Alamosa. Details for the hearing will be published in the Federal Register and local newspapers.

APPENDICES

APPENDIX 1.	Soils
APPENDIX 2.	Vegetation
APPENDIX 3.	Wildlife

APPENDIX 1.

SOILS

Figure 1-A	Description of Soils
Figure 1-B	Description of Soil Associations in Saguache County

Acacio

The Acacio soil consists of well-drained slightly saline to moderately saline soils that have a high concentration of gypsum. This soil occurs on alluvial flood plains and develops in medium-textured calcareous alluvial material.

The surface layer of this soil is very dark in color with grayish brown heavy sandy loam that is noncalcareous, strongly alkaline, and about 4 inches thick. The subsoil is dark brown clay loam in the upper portion and dark grayish brown sandy clay loam in the lower part. The subsoil is moderately calcareous, moderately alkaline to strongly alkaline, and contains small spots of salt that increase in number in the lower part of the subsoil. The upper 34 inches of the substratum consists of brown and light yellowish brown loam that is slightly calcareous to moderately calcareous, moderately alkaline and that contains about 40 percent fine crystalline gypsum in the lower part. The lower part of the substratum is dark yellowish brown clay loam that has mottles of yellowish brown, has small nodules of lime throughout, is moderately alkaline, and extends to a depth of 60 inches or more.

Acacio soil has moderate permeability to a depth of 40 inches and moderately slow permeability below that depth. This soil has moderate to high available water holding capacity, and allows plant roots to extend to a depth of 60 inches or more. Surface runoff is slow to moderate. The hazard of this soil blowing is slight to moderate on nonirrigated areas for which a vegetative cover is not maintained.

Alamosa

The Alamosa soil is a deep poorly to somewhat poorly drained soil.

It forms in loamy alluvium on flood plains at elevations ranging from 7,600 to 8,000 feet. The surface layer of this soil is very dark brown loam about 9 inches thick. The subsoil is a black clay loam about 30 inches thick, with yellowish brown mottles in the lower part. The underlying layer is very dark grayish brown sandy clay loam about 9 inches thick and has yellowish brown mottles which overlie sand and gravel and extend to 60 inches or more. The soil is moderately slow in permeability and has a high available water capacity. The saline phase has a moderate available water capacity. Reaction ranges from neutral to moderately alkaline and effective rooting depth is 40 to 60 inches.

Arena

The Arena soil is a deep somewhat poorly drained soil on old alluvial flood plains at elevations of 7,500 to 7,800 feet. It forms in mixed alluvial parent material. The surface layer of the soil is light gray loam about 2 inches thick, and the subsoil is grayish brown sandy clay loam about 28 inches thick. The upper 20 inches of the substratum is grayish brown sandy clay loam. It has a few mottles and some cementation by silicaceous material, soluble in alkali. This layer is very strongly alkaline, with visible lime and other salts in seams and spots. Below this layer is about 8 inches of light brownish gray loamy sand. It has a few mottles, is strongly alkaline, and contains some brittle peds and concretions. The next underlying layer to 60 inches or more is pale brown stratified sandy loam and sandy clay loam. This layer has brittle peds and concretions in a few places and a few faint mottles. Permeability is slow. Effective rooting depth is 15 to 40 inches. Surface runoff is slow and wind erosion hazard is moderate. A water table occurs at 3.5 feet to 5 feet from the surface.

Bushvalley

The Bushvalley soil is a shallow very stony well-drained soil in mountain parks above 9,000 feet. This soil has formed in thin colluvial material from volcanic rock. The surface layer of the soil is brown very cobbly loam about 4 inches thick. The upper 10 inches of the subsoil is dark brown very cobbly sandy clay loam and the lower 3 inches is brown very cobbly clay loam. Depth to rhyolite bedrock ranges from 10 to 20 inches. Permeability is moderately slow. Available water capacity is low. Effective rooting depth ranges from 10 to 20 inches. Surface runoff is medium to rapid and erosion hazard is severe.

Celeste

The Celeste soil is a shallow somewhat excessively drained soil. It forms in loamy residium on mountainsides in slopes ranging from 5 to 25 percent and at elevations ranging from 8,000 to 9,200 feet. The surface layer of this soil is very dark grayish brown, very stony loam about 4 inches thick. The underlying layer is dark reddish brown loam about 10 inches thick and overlies bedrock of rhyolite, andesite, or latite that extends to 60 inches or more. The soil profile has about 50 percent stones throughout. The coleste soil includes 35 to 60 percent rock outcropping in the form of vertical cliffs and escarpments. The soil is moderately permeable and has a low available water capacity. Reaction is mildly alkaline and effective rooting depth is 10 to 20 inches.

Corlett

The Corlett soils are somewhat excessively drained alkali soils. The form in low dunes is reworked wind-modified sand material. The dunes range from 5 to 10 acres in size and are from 2 to 15 feet high. The surface layer of this soil is dark grayish brown sand about 8 inches thick. It is slightly calcareous and is very strongly alkaline. The substratum is mainly brown sand that is slightly calcareous and very strongly alkaline. This horizon extends to a depth of 5 feet or more.

Corlett soils have rapid permeability and low available water holding capacity. The water table in places is within 3.5 feet of the surface. Depth to the water table depends on the height of the dunes. At the tops of dunes the water table is more than 5 feet below the surface. Roots may penetrate to a depth of 60 inches or more unless their growth is limited by the water table. Surface runoff is slow from the soil and the hazard of soil blowing is very severe if the vegetation cover is not adequate.

Costilla

The Costilla soil is somewhat excessively drained, coarse-textured and occurs on nearly level to gently sloping alluvial flood plains. The surface layer of this soil is dark grayish brown gravelly loamy sand about 4 inches thick. It is noncalcareous and is mildly alkaline. The next layer is dark brown loamy sand about 9 inches thick. It is moderately calcareous and strongly alkaline in the lower part. The substratum to a depth of 60 inches is brown mainly gravelly loamy sand and gravelly sand that is highly calcareous and strongly alkaline. The Costilla soil has very low available water holding capacity and is very droughty. Permeability is rapid. Plant roots can penetrate to a depth of 60 inches or more. Surface runoff from the soil is slow and the hazard of soil blowing is severe if the vegetation cover is removed.

Comodore

The Comodore soil is well-drained and occurs on extremely steep mountain slopes. Beneath this soil, at a depth of 4 to 16 inches, are acid igneous and metamorphic rock, which are noncalcareous and have many cobblestones and stones throughout the profile and on the surface. The surface layer of this soil is very dark brown stony loam about 5 inches thick. It is noncalcareous and slightly acid. The next layer is dark brown very stony loam about 10 inches thick, which is noncalcareous and slightly acid. This layer is about 70 percent stones and it is granitic and metamorphic bedrock.

The Comodore soil has moderate permeability to the bedrock and very low available water holding capacity. Plant roots extend to bedrock. Surface runoff is very rapid and the hazard of erosion is severe. This soil is generally too steep and rocky for grazing.

Cotopaxi

The Cotopaxi soil is an excessively drained sandy soil that forms in wind-modified sand which was blown up from the valley floor. The surface layer of this soil is dark brown sand about 8 inches thick and is noncalcareous and mildly alkaline. The underlying material is dark brown sand that is noncalcareous and mildly alkaline and extends to a depth of 5 feet or more. Dominant slopes are 10 to 25 percent. The areas are dunelike and contain dunes as much as 15 feet higher than the depressions. The soil surface is winnowed and has the appearance of shifting sand. Screened samples indicate that this soil is 10 percent coarse sand, 40 percent medium sand, 47 percent fine sand, and 3 percent fines. Runoff is very slow. The hazard of soil blowing is very severe if the vegetative cover is not adequate. The soil has rapid permeability and a very low water holding capacity. Plant roots penetrate to a depth of 60 inches or more.

Curecenti

The Curecenti soil is a deep well drained very cobbly soil. It forms in mixed alluvial material and occurs on steep alluvial fans and high terraces. Typically, the surface layer is grayish brown very cobbly loam about 3 inches thick. The subsoil is brown or pale brown very cobbly sandy clay loam about 31 inches thick. The substratum is light brownish gray extremely cobbly coarse laomy sand, extends to 60 inches or more. Permeability is moderate. The effective rooting depth is 10 to 20 inches, and the available water capacity is very low. Surface runoff is medium and the erosion hazard is moderate.

Cumbres

The Cumbres soil is a moderately deep well-drained soil occurring on gently to moderately sloping hills, ridges, and mountain sides at 8,000 to 9,300 feet. It forms in materials weathered from igneous rock and occurs in slopes ranging from 1 to 9 percent. The surface layer of this soil is a grayish brown very stony loam about 4 inches thick. The subsoil is a brown very stony to extremely stony heavy clay loam about 12 inches thick. The substratum to about 22 inches is light gray extremely stony sandy loam with much visible lime and overlies basalt bedrock that is fractured in some places. Permeability is moderately slow and effective rooting depth is about 22 inches. Available water capacity is moderate. Organic matter content in the surface layer is low. Surface runoff is medium to rapid and erosion hazard is light to moderate.

Derrick

The Derrick soil is deep, cobbly, well-drained, less than 20 inches thick and occurs over sand, gravel, and cobble. It occupies alluvial fans and terraces along the edge of the valley floor on nearly level to gentle slopes. The surface layer of this soil is a very cobbly sandy loam about 5 inches thick. The subsoil is a very gravelly sandy clay loam about 6 inches thick. The substratum to a depth of about 17 inches is very cobbly loamy sand with continuous secondary calcium carbonate accumulations about 6 inches thick, over sand, gravel, and cobble that extends to 60 inches or more. The undersides of the cobbles are lime coated in some of the upper part of the subsoil.

Permeability is moderately rapid. Effective rooting depth is about 17 inches. Available water capacity is low and organic matter in the surface layer is very low. Surface runoff is slow and erosion hazard is slight to moderate.

Dunnul

The Dunnul soil is a deep well-drained or excessively drained soil on alluvial fans and terraces at elevations of 7,600 to 8,000 feet. It forms in very gravelly coarse-textured alluvial materials derived from mixed sources on nearly level to gentle slopes. The surface layer of this soil is a gravelly sandy loam about 8 inches thick, over sand, gravel, and cobble that extends to 60 inches or more. Permeability is rapid. Effective rooting depth is about 10 inches and available water capacity is very low. Organic matter content in the surface layer is very low. Surface runoff is slow and erosion hazard is slight.

Dune Land

The Dune Land is a miscellaneous land-type soil that consists of constantly shifting sand measuring as high as 600 feet. Most of the sand is medium-sized. This sand has been deposited by wind, presumably by the southwesterly winds that blow across the valley. As the winds rise over the Sangre de Cristo Mountains, they lose their velocity and drop the sand. For Dune Land, surface runoff is very slow, permeability is very rapid, and the available water holding capacity is very low. There is little or no vegetation on the dunes. Some weeds grow in low depressions between some of the dunes.

Embargo

The Embargo soil is a moderately deep well-drained soil. It forms on mountain slopes, at ranges from 9,000 to 10,000 feet, in clayey residual material derived from rhyolite. The surface layer of this soil is dark brown very stony loam about 12 inches thick. The subsoil is dark brown clay about 22 inches thick. It overlies rhyolite bedrock that extends to 60 inches or more. The subsoil contains about 60 percent stones and cobble. There are minor inclusions of rock outcrop occurring through the Embargo soil. This soil is slowly permeable and has a low available water capacity. Reaction ranges from neutral to mildly alkaline. Effective rooting depth is 20 to 40 inches. Surface runoff is moderate. Erosion hazard is low.

Empedrado

The Empedrado soil is a deep well-drained soil that forms on upland hills and alluvial fans at elevations ranging from 8,000 to 9,200 feet. The surface layer of this soil is brown loam about 4 inches thick. The upper 9 inches of the subsoil is brown sandy clay loam, and the lower 9 inches is pinkish gray sandy clay loam. The substratum is very pale brown loam about 18 inches thick. Decomposed rhyolite rock occurs at 40 to 60 inches. Permeability is moderate to moderately slow. The effective rooting depth ranges from 20 to 40 inches, and the available water capacity is high. Surface runoff is medium and the erosion hazard is moderate.

Fluvaquent

The Fluvaquent soil consists of laomy alluvial lands with the texture ranging from loam to clay loam over sand at depths of more than 2 feet. This land type is highly stratified and subject ot overflow. Much of it has a water table throughout most of the year. Permeability is moderate to slow. Surface runoff is slow. The hazard of erosion is slight and the water holding capacity is moderate to high.

Fulcher

The Fulcher soil is deep, well-drained and forms in clayey alluvium on alluvid fans and mountainsides in slopes ranging from 3 to 10 percent. This soil occurs at elevations ranging from 8,300 to 9,500 feet and has a surface layer that is very dark grayish brown cobbly loam and about 11 inches thick. The subsoil is dark brown cobbly heavy clay loam about 31 inches thick. It overlies a dark grayish brown cobbly sandy clay loam that extends to 60 inches or more. The soil is moderate to slowly permeable and has a high available water capacity. Reaction ranges from mildly alkaline to moderately alkaline. Effective rooting depth is over 60 inches. Both surface runoff and water erosion hazards are moderate. Numerous small gullies and creek channels occur throughout this soil.

Garita

The Garita soil is deep and well-drained and occurs on alluvial fans and terraces at elevations of 7,500 to 8,500 feet, in slopes ranging from 0 to 25 percent. It forms in thick calcareous very gravelly materials derived principally from basalt bedrock. The surface layer of this soil is pale brown cobbly loam about 7 inches thick. The subsurface layer is light yellowish brown cobbly loam about 4 inches thick. The upper 11 inches of the substratum is light gray gravelly loam that is very strongly calcareous with lime accumulated in a moderately marly layer. The lower part of the substratum, from a depth of 22 to 60 inches or more, is light gray gravelly fine sandy loam that is calcareous and contains less calcium carbonate than the layer above. Permeability is moderate. Effective rooting depth is 5 to 40 inches. Available water capacity is moderate. Organic matter content in the surface layer is low. Surface runoff is moderate and erosion hazard is moderate.

Graypoint

The Graypoint soil is deep and well-drained, occuring on broad alluvial fans and terraces at elevations of 7,600 to 7,800 feet. It forms in alluvial sediments derived principally from basalt and occurs on slopes varying from 1 to 3 percent. The surface layer of this soil is brown gravelly sandy loam about 5 inches thick. The upper 7 inches of the subsoil is yellowish brown gravelly sandy clay loam; the lower 6 inches is pale brown very gravelly sandy loam with some lime coatings on the undersides of gravel and cobble. The substratum, from 18 to 60 inches or more, consists of sand and gravel. Permeability is moderate in the surface and subsoil layers but rapid to very rapid in the substratum. Effective rooting depth is 10 to 20 inches. Available water capacity is low. Organic matter content in the surface layer is low. Surface runoff is slow and erosion hazard is slight.

Hooper

The Hooper soil is well-drained, moderately fine textures, occuring mainly on the level flood plain of the valley floor. This soil is strongly alkali. In some places the soils occur in basins, are flooded from runoff water, and have a high water table. This soil occurs on slopes from 0 to 1 percent. The surface layer of this soil is dark grayish brown loamy sand and sandy loam about 7 inches thick. This layer is strongly calcareous and is very strongly alkaline. The subsoil is brown clay loam and grayish brown sandy clay loam about 11 inches thick. This layer is moderately calcareous and very strongly alkaline. The upper part of the substratum is grayish brown sandy loam about 16 inches thick and is moderately calcareous and very strongly alkaline. The lower part of the substratum is loose sand beginning at a depth of about 32 inches. It is slightly calcareous and very strongly alkaline and extends to a depth of 60 inches or more.

The Hooper soil has very slow permeability and low available water holding capacity. Surface runoff is slow and the hazard of erosion ranges from moderate to slight.

Jerry

The Jerry soil is deep and either well-drained or moderately well-drained and can be found on gently sloping to moderately steep mountainsides and valley filling sideslopes at elevations of 8,500 to nearly 10,000 feet. It forms in moderately fine-textured and gravelly alluvium material. The surface layer is 12 inches thick and is dark colored in the upper few inches and very light colored below. The subsoil is very stony clay or heavy clay loam about 18 inches thick. The substratum is very stony clay loam that extends to 60 inches or more. Permeability is slow. Effective rooting depth is about 40 inches or more. Available water capacity is moderate. Surface runoff is rapid and erosion hazard is moderately high. The cover on this soil is primarily woodland with very little grass underlay for grazing.

La Sauses

The La Sauses soil is deep, poorly drained, and saline-alkali found on alluvial flood plains at elevations of 7,600 to 7,800 feet. It forms in fine and moderately fine textured alluvial materials mainly derived from igneous rocks, and it occurs in level to nearly level slopes. The surface layer is brownish yellow heavy sandy clay loam about 4 inches thick. The subsoil is heavy clay loam about 26 inches thick. The substratum to 52 inches is heavy clay loam and sandy clay loam in stratified layers. Below 52 inches the substratum consists of sand and gravel beds that are generally several feet thick. Mottles are common in the subsoil and substratum.

Permeability is slow. Effective rooting depth is about 30 inches. Available water capacity is moderately low. Surface runoff is slow and erosion hazard is slight. A seasonal high water table is within .5 to 2 feet of the soil surface during spring and early summer of most years.

Luhon

The Luhon soil is deep and well-drained and occurs on alluvial fans and terraces at elevations of 7,600 to 8,000 feet. It forms in mixed calcareous alluvial fan sediments on slopes ranging from 1 to 9 percent. The surface layer of this soil is pinkish gray loam about 8 inches thick. The substratum above 20 inches is light yellowish brown gravelly loam with much visible calcium carbonate. Below 20 inches is a pink loam with less visible calcium carbonate than the layer above. This extends to 60 inches or more. Permeability is moderate. Effective rooting depth is about 60 inches. Available waterholding capacity is moderately high. Surface runoff is medium and erosion hazard is moderate.

Monte

The Monte soil is deep and well-drained. It occurs on alluvial fans and flood plains at elevations of 7,600 to 8,600 feet and forms in mixed calcareous alluvial sediments derived mainly from igneous rocks. This soil occurs on nearly level and gentle slopes. The surface layer is loam or fine sandy loam that is calcareous and about 9 inches thick. The substratum is calcareous loam that extends to 60 inches or more. Available water capacity is high. Surface runoff is medium and erosion hazard is moderate.

Mount Home

The Mount Home soil is very cobbly, moderately coarse in texture, and somewhat excessively drained. It forms in alluvial material on the fans at the foot of the Sangre de Cristo Mountains and occurs on slopes ranging from 4 to 12 percent. The surface layer of this soil is very dark grayish brown very cobbly sandy loam and very cobbly fine sandy loam about 17 inches thick. It is moderately alkaline and is about 65 percent cobblestones, stones, and gravel. The upper 5 inches is noncalcareous and the lower part is slightly calcareous. The substratum to a depth of 60 inches is brown very cobbly sandy loam that is highly calcareous, is moderately alkaline, and is about 85 percent cobblestones, stones, and gravel. The amount of lime decreases in the lower part of the substratum.

The Mount Home soil has moderately rapid permeability. Some streams that originate in the mountains disappear into this very cobbly soil. The available water holding capacity is very low. Surface runoff is slow. The hazard of erosion is slight to moderate.

Nortonville

The Nortonville soil is medium textured, somewhat poorly drained, and saline-alkali and is found in nearby level low flood plains of the valley floor. The soil forms in weakly stratified, medium to moderately fine textured alluvium. The surface layer of this soil is very dark brown loam about 5 inches thick. It is calcareous and strongly alkaline and contains some salt spots. The next 4 inches are similar except that they contain very dark grayish brown light clay loam and gypsum and salt spots. The upper 20 inches of the substratum is dark grayish brown and dark brown clay loam and loam. It is moderately calcareous and strongly alkaline. Below this, to a depth of 60 inches or more, the substratum consists of dark brown layers of loam and fine sandy loam. These layers are noncalcareous and moderately alkaline and contain many fine yellowish brown mottles.

Nortonville soils have moderately slow permeability and high available water holding capacity. The water table is at a depth of 2 feet during the growing season and is generally at a depth of about 3 to 4 feet during the winter. Surface runoff is slow and the erosion hazard is slight.

Platoro

The Platoro soil is well-drained, developing on alluvial fans and terraces. This soil has a medium-textured surface layer and a moderately fine textured subsoil which overlies gravel and cobbles at a depth of 20 to 40 inches. The permeability of this soil is moderately slow. Surface runoff is slow and erosion hazard is moderate. The water holding capacity is moderate to high.

Rock Outcrops

Over 90 percent of rock outcrops is bare rock and the remaining portion is shallow to very shallow soils with physical characteristics that are submerged by the rock outcroppings. Scattered patches of grasses, shrubs, and trees occur throughout this land type. Surface runoff is very rapid.

Ryan Park

The Ryan Park soil is deep, excessively drained and occurs on gently sloping fans at elevations of 7,600 to 7,900 feet. It forms in mixed alluvial materials and can be found on slopes ranging from 3 to 5 percent. The surface layer of this soil is light sandy loam about 5 inches thick. The subsoil layer is sandy loam about 27 inches thick over loamy sand substratum that extends to 60 inches or more. There is a layer of visible lime accumulation about 20 inches or more thick in the lower part of the subsoil and in the upper part of the substratum. Permeability of this soil is moderately rapid or rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderately low. Surface runoff is slow and wind erosion hazard is moderate to severe.

Seitz

The Seitz soil is deep, well-drained and is found on moderately sloping to very steep mountainsides and ridges. It forms in slopewash materials derived from igneous rocks at elevations ranging from 9,600 to 11,000 feet. The soil occurs in slopes ranging from 10 to 65 percent. There is a thin organic layer of partially decomposed needles and twigs on the surface of this soil. The surface layer is very stony loam about 12 inches thick and is dark colored in the upper few inches and very light colored below. The subsoil consists of very stony clay or heavy clay loam about 18 inches thick. The substratum is very stony clay loam that extends to 60 inches or more. Permeability is slow. Effective rooting depth is about 40 inches or more. Available water capacity is moderate. Surface runoff is slow and erosion hazard is moderately high.

The cover on this soil is primarily woodland with very little grass underlay for grazing.

San Arcacio

The San Arcacio soil is moderately well-drained, occuring on flat alluvial flood plains. These soils form in mixed calcareous alluvium and are underlain by gravel and sand at a depth of 20 to 36 inches. The surface layer of this soil is dark brown sandy loam about 9 inches thick. It is noncalcareous and moderately alkaline. The subsoil is dark brown sandy clay loam about 5 inches thick. It is noncalcareous and moderately alkaline. The upper 4 inches of the substratum is pale brown sandy clay loam that is highly calcareous and strongly alkaline. The next 6 inches is dark grayish brown loamy sand that is calcareous and strongly alkaline. Below this is noncalcareous sand and gravel that extends to a depth of 60 inches or more. San Arcacio soils have moderate permeability and low available water holding capacity. Surface runoff is slow and the hazard of soil blowing is slight to moderate if the vegetative cover is removed.

Space City

The Space City soil is somewhat excessively drained, coarse-textured, and calcareous. The sandy material is mostly of igneous origin and has been washed down on the alluvial fans and subsequently reworked by wind. The surface layer of the soil is dark grayish brown loamy fine sand that is noncalcareous, moderately alkaline, and about 9 inches thick. Below the surface layer is dark grayish brown loamy fine sand. It is noncalcareous to a depth of about 30 inches and is moderately calcareous below that depth. This layer has visible lime spots in the lower 30 inches. Space City soils have rapid permeability and low available water holding capacity. Surface runoff is very slow and the erosion hazard is severe if the vegetation cover is removed.

Stunner

The Stunner soil is deep and well-drained and occurs on nearly level to gently sloping fans at elevations of 7,800 to 8,400 feet. It forms in calcareous alluvial material mainly derived from basalt rock. Generally the slopes range from 0 to 3 percent. Typically the surface layer is loam about 5 inches thick. The subsoil layer is clay loam about 16 inches thick and contains visible lime in the lower part. The substratum is loam that is calcareous and extends to 60 inches or more. Permeability of this soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium and erosion hazard is moderate.

Tolman

The Tolman soil is shallow and well-drained. It forms in loamy residium on foothills with slopes ranging from 10 to 25 percent. Elevation is 8,000 to 9,200 feet. The surface layer of this soil is dark brown, very stony loam about 4 inches thick. The subsoil is dark brown, very cobbly clay loam about 4 inches thick. The underlying layer is dark grayish brown, very cobbly loam about 4 inches thick; it overlies bedrock of rhyolite, andesite, or latite that extends to 60 inches or more. The subsoil has about 55 percent stones and cobble, and the underlying layer has about 70 percent stones and cobble. The soil is moderately permeable and has a low available water capacity. Reaction is neutral and effective rooting depth is 10 to 20 inches. Surface runoff is moderate to rapid. Erosion hazard is low.

Traveler

The Traveler soil is shallow, somewhat excessively drained and occurs on low, gently sloping ridges and mesa tops at elevations of 7,600 to 8.300 feet. It forms in materials weathered from basalt rock and occurs on slopes ranging from 1 to 25 percent. The surface layer of this soil is very gravelly loam about 4 inches thick. The subsoil is very gravelly loam about 7 inches thick. The substratum is very gravelly loam with much visible lime and overlies basalt bedrock at about 17 inches. Permeability is moderate. Effective rooting depth is less than 20 inches. Available water capacity is low, surface runoff is medium, and erosion hazard is moderate.

Uracca

The Uracca soil is somewhat excessively drained, moderately steep, and very cobbly. It occurs on alluvial fans at the foot of the Sangre de Cristo Range along the eastern edge of the San Luis Valley, forms in alluvium, and contains many large cobblestones of acid igenous origin that cover a large part of the surface. The soil occurs on slopes ranging from 15 to 18 percent. The surface layer is very dark grayish brown very cobbly loam. It is noncalcareous, moderately alkaline, about 4 inches thick, and approximately 60 percent cobblestones. The subsoil is dark brown or very dark grayish brown, very cobbly clay loam or very cobbly coarse sandy loam that is noncalcareous, moderately alkaline, and about 9 inches thick. It is 60 to 75 percent cobblestones throughout. The substratum is dark brown and dark grayish brown very cobbly coarse loamy sand or very cobbly coarse sandy loam. It is noncalcareous in the upper part, moderately calcareous in the lower part, and moderately alkaline. This layer is about 75 percent cobblestones. The percentage of cobblestones increases with depth. Cobblestones, gravel, and some boulders occur between depths of 23 and 60 inches.

The Uracca soil has moderate permeability in its subsoil and very rapid permeability in its substratum. It has very low available water holding capacity and the runoff is slow because the soil is very cobbly. Many streams that originate in the mountains disappear into fans containg this soil. The hazard of erosion is slight, even though there are old gullies through this soil. This soil provides only limited grazing for livestock.

Vastine

The Vastine soil is poorly drained, occuring on level, low bottom lands along major creeks. These soils form in moderately fine-textured stratified alluvial material and are underlain by sand. The surface layer of this soil is black loam about 10 inches thick. It is slightly calcareous in the upper 2 inches, noncalcareous in the lower part, and moderately alkaline. The subsoil is sandy clay loam about 20 inches thick. It has variegated colors of dark grayish brown, dark gray, and olive brown. It is noncalcareous and moderately alkaline. The substratum is dark gray sand or loamy sand that is noncalcareous and moderately alkaline and which extends to a depth of 60 inches or more.

Vastine soils have a water table that normally is at a depth of about 20 inches but fluctuates between depths of 1 and 2.5 feet as determined by the height of the water in the creek. In spring most areas are flooded from overflowing creeks, but in fall the water table may drop to a depth of about 3 feet in places. Permeability is moderate or moderately slow. The available water holding capacity is moderate. The surface runoff is slow and the erosion hazard is slight.

Youga

The Youga soil is deep and well-drained. It forms in glacial till or alluvial outwash materials and occurs on slopes ranging from 3 to 25 percent. The surface layer of this soil is dark grayish brown loam about 7 inches thick. The upper 7 inches of the subsoil is very dark grayish brown clay loam. The lower 17 inches is light brown clay loam. The substratum is pinkish gray clay loam about 11 inches thick. Rhyolite bedrock fractured in places occurs at about 44 inches. Permeability of this soil is moderate to slow. The effective rooting depth is 40 to 50 inches, and available water capacity is moderate to moderately high. Surface runoff is medium to rapid and the erosion hazard is moderate.

Zinger

The Zinger soil is deep and well-drained and is found on nearly level fans and terraces at elevations of 7,500 to 7,800 feet. It forms in mixed alluvial materials mainly derived from igneous rocks. The surface layer of this soil is loam about 11 inches thick. The substratum above 28 inches is heavy sandy loam over a light clay loam that extends to 60 inches or more. There is a layer of strong lime accumulation 10 to 40 inches thick in the substratum. Permeability is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is slow and erosion hazard is slight.

Description of Soil Associations in Saguache County.

Following is a description of soil associations that occur in Saguache County. These associations do not occur lower in the San Luis Valley and therefore are lested separately.

Cryaquolls Association

The soils in this association are dark-colored, cold, moderately shallow to deep (20 to 60 inches over gravels and sands), moderately fine to moderately coarse-textured, and somewhat poorly drained. They occur on level bottomlands at elevations from 8,300 to 11,500 feet. These soils are wet, having a high water table most of the year. Organic matter content in the surface is high, and most often there is an organic mat on the surface.

Cryoboralf-Rock Outcrop Association

The soils portion of this association develops under a conifer cover at elevations ranging from 9,000 to 11,500 feet. The soils have a thin mantle of needles on the surface over a thin dark-colored soil layer. The texture of this layer ranges from moderately sandy to loamy and is underlain with a light-colored ashy layer. The subsoil usually has some soil development and is clayey in nature. The pH of these soils is usually less than seven. The amount of stone throughout the soil varies from 15 to 75 percent, and the depth to bedrock varies from a few inches to over 60 inches. Only limited grazing takes place on these soils.

Cryoborolls Association

The Cryoborolls association is cold, shallow to deep, medium- to moderately fine textured, dark-colored with thick surface soil, well-drained, noncalcareous, nonstony to very stony, and occurs over bedrock on gently sloping to moderately steep subalpine mountain slopes. This association is found in high mountain parks at elevations between 9,500 and 11,500 feet. The soils have a thick, dark-colored surface, and the subsoil may or may not contain more clay than the surface. The stoniness throughout the profile varies from zero to 75 percent. Because of lack of detailed information concerning these soils, their potential productivity has not been estimated.

Cryoborolls-Argiborolls Association

The soils of the Cryoborolls-Argiborolls association occupy the open mountain areas at elevations ranging from 8,500 to 9,500 feet. The texture of the soils in the association ranges from sandy loam to clay loam with the depth to bedrock ranging from shallow to deep. The amount of stoniness throughout the soil profile varies from slight to very stony. The soils on the steep slopes and ridges are shallow, but the lower slopes of the mountain and the swales between the mountains are normally deep over bedrock. The bedrock in these mountain areas consists of rhyolite, andesite, and latite. The surface runoff from the association is slow to moderate. Because of the high variability of the depth of this association, the permeability and water holding capacity have not been rated.

Haplargids-Calciorthods-Torriorthents Association

The Haplargids-Calciorthods-Torriorthents association contains soils that are deep, light-colored, loamy to sandy loam in texture, and well-drained. The cobble and gravel content of these soils ranges from zero to 20 percent. These soils are on strongly sloping to steep slopes and develop on fans and in the foothills at elevations ranging from 8,000 to 9,000 feet. The surface runoff is low to moderate. The water holding capacity and the permeability are moderate. There is some gullying throughout this association.

Haploborolls-Argiborolls Association

The soils of the Haploborolls-Argiborolls association are usually on steep slopes at elevations between 8,000 and 9,500 feet and below the spruce-fir zone. The texture of the surface soil is normally loamy with loam to clay loam subsoil. They are deep over colluvial parent material but bedrock may be encountered at depths over 40 inches. The soil profile includes 25 to 45 percent stones and cobbles. Surface runoff is slow to moderate. Permeability and the water holding capacity of these soils have not been determined because of the high variability of the texture of these soils.

APPENDIX 2.

VEGETATION

Figure 2-A Vascular Plants of San Luis Valley

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY

ACERACEAE
Acer glabrum
Acer negundo
Acer saccharinum

ANACARDIACEAE
Rhus glabra
Rhus aromatica var. serotine
Rhus typhina
Rhus trilobata

BORAGINACEAE
Crytantha jamesii
Cryptantha pustulosa
Hackelia floribunda
Hackelia virginiana
Lappula redowskii
Lithospermum incisum
Lithospermum multiflorum
Martensia ciliata
Mertensia viridis
Plagiobothrys scopulorum

CACTACEAE
Cereus grandiflorus
Echinocareus sp.
Echinocareus viridiflorus
Opuntia polyacantha
Pediocactus simpsonnii

CAMPANULACEAE
Campanula parryi
Campanula petiolata
Campanula rotundifolia

CANNABACEAE
Humulus lupulus
Humulus lupinus

CAPPARIDACEAE
Cleome conorae
Cleome serrulata

CAPRIFOLIACEAE
Kolkwitzia amabilis
Lonicera involucrata
Lonicera tatarica
Linnaea americana
Linnaea borealis
Sambucus pubens
Sambucus racemosa
Symphoricarpos oreophilus
Symphoricarpos rotundifolius

CAYOPHYLLACEAE
Arenaria fendleri
Arenaria macrantha
Arenaria obtusiloba
Cerastium arvense
Paronychia jamesii
Saponaria officinalis
Silene acaulis
Silene menziesii
Stellaria longifolia
Stellaria media
Stellaria longipes

CELASTRACEAE
Pachystima myrisinites

CERATOPHYLLACEAE
Ceratophyllum demersum

CHENOPODIACEAE
Artiplex hortensis
Artiplex canescens
Beta vulgaris
Chenopodium album
Chenopodium fremontii
Chenopodium sp.
Chenopodium capitatum
Eurotia lanata
Kochia scoparia
Monolepsis nuttalliana
Salicornia rubra

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

CHENOPODIACEAE - (cont.)

- Salsola kali
- Sarcobatus vermiculatus
- Suadea depressa
- Cycloloma atriplicifolium

COMPOSITAE

- Achillea lanulosa
- Achillea millefolium
- Apolpappus parryi
- Antennaria alpina
- Antennaria aprica
- Antennaria microphylla
- Antennaria pervifolia
- Antennaria rosea
- Antennaria rosulata
- Arnica cordifolia
- Artemisia aromatica
- Artemisia cana
- Artemisia carruthii
- Artemisia dracunculus
- Artemisia franserioides
- Artemisia frigida
- Artemisia lucociciana
- Artemisia tridentata
- Aster adscendens
- Aster bigelovii
- Aster chilensis
- Aster laevis
- Aster rubrotinctus
- Aster (Machaeranthera) rubicaulis
- Aster (Machaeranthera) tenacetifolius
- Bahia neomexicana
- Bahia oppositifolia
- Bidens bipinnata
- Bidens cernua
- Bidens glaucescens
- Bidens tenulsecta
- Brickellia grandiflora
- Carthamus tinctorius
- Centaurea cyamus
- Centaurea picris
- Centaurea repens
- Centaurea solstitialis
- Crysothamnus filifolus
- Chrysothamnus maximum
- Chrysothamnus nauseosus
- Chrysothamnus viscidiflorus
- Cichorium intybus
- Cirsium arvense
- Cirsium drummondi
- Cirsium undulatum
- Conyza canadensis
- Crepis glauca
- Crepis perplexans
- Crepis runcinata
- Dyssodia papposa
- Erigeron acris var. debilis
- Erigeron annuus
- Erigeron canadensis
- Erigeron compositus
- Erigeron consobrinus
- Erigeron flagellaris
- Erigeron glabellus
- Erigeron lonchophyllus
- Erigeron speciosus
- Erigeron subtrinervis
- Erigeron vetensis
- Franseria acanthicarpa
- Gnaphalium grayi
- Grindelia squarrosa
- Gutierrizia diversifolia
- Gutierrizia sarothrae
- Haplopappus spinulosus
- Helianthella parryi
- Helianthus annuus
- Helianthus nuttallii
- Helianthus petiolaris
- Hymenoxys acaulis (actinea a.)
- Hymenoxys richardsonii (actinea r.)
- Iva axillaris
- Iva xanthifolia

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

COMPOSITAE (cont.)
Lactuca tatarica var. pulchella
Lactuca sativa
Lygodesmia juncea
Rudbeckia hirta
Rudbeckia laciniata
Senecio slymoides
Senecio ambrosioides
Senecio amprosioides
Senecio fendleri
Senecio hallii
Senecio pudicus
Senecio spartioides
Senecio triangularis
Senecio tridenticulatus
Solidago glutinosa
Solidago sparsiflora
Solidago spathulata
Sonchus oleraceus
Stephanomeria pauciflora
Suaeda depressa
Suaeda sp.
Tagetes erecta
Taraxacum erythrosperum
Taraxacum mexicanum
Taraxacum officinale
Tetradymia canescens
Townsendia exscapa
Tragopogon pratensis
Tragopogon dubius
Verbesina encelioides
Viguiera multiflora
Xanthium echinatum
Zinnia elegans
Zinnia pumila

CONVOLVULACEAE
Convolvulus arucuse
Convolvulus sepium

CORNACEAE
Cornus baileyi
Cornus stolonifera

CORYLACEAE
Alnus tenuifolia
Betula fontinalis

GRASSULACEAE
Sedum rodanthum
Sedum rosea integrifolium
Sedum stenopetalum

CRUCIFERAE
Arabis fendleri
Arabis hirsuta
Capsella bursa-pastoris
Cardamine cordifolia
Cardaria draba
Descurainia halictorum
Descurainia pinnata
Descurainia richardsonii
Erysiumum asperum
Erysimum capitatum var. argillosum
Erysimum parviflorum
Lepidium densiflorum
Lepidium draba
Lepidium racemosum
Lepidium repens
Lepidium montanum
Lepidium montanum var. alyssoides
Lesquerella montana
Lobularia maritima
Nasturtium officinale
Hesperis matronalis

CYPERACEAE
Carex douglasi
Carex eleocharis

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

CYPERACEAE (cont.)
Carex festivella
Carex heliophila
Carex interior
Carex neb
Carex prapegracilis
Carex rostrata
Carex sp.
Cyperus alternifolius
Cyperus inflexus
Scirpus sp.
Scirpus americanus
Scirpus paludosus
Scirpus validus

CUCURBITACEAE
Cucurbita pepo

ELAEAGNACEAE
Elaeagnus angustifolis
Shepherdia canadensis

EQUISETACEAE
Equisetum arvense
Equisetum hyemale var. intermedium
Equisetum kansanum

ERICACEAE
Arctostaphylos uva-ursi
Vaccinum myritillus

EUPHORBIACEAE
Euphorbia glyptosperma
Euphorbia robusta
Euphorbia serphyllifolia

FAGACEAE
Quercus gambellii

FUMARIACEAE
Corydalis aurea
Corydalis brandegei
Corydalis caseana

GERANIACEAE
Erodium cicutarium
Geranium caespotosum
Geranium fremontii
Geranium richardoni
Pelargonium zonale

GENTIANACEAE
Gentiana amarella
Gentiana elegans
Gentiana romanzovii
Swertia radiata

GRAMINEAE
Agropyron cristatum
Agropyron desertorum
Agropyron smithii
Agropyron trachycaulum
(A. pauciflorum)
Agrostis alba
Agrostis hymalia
Agrostis scabra
Alopecureus pratensis
Avena sativa
Bouteloua gracilis
Bromus ciliatus
Bromus inermis
Bromus tectorum
Calamagrostis canadensis
Calamogrostis neglecta
Calamovilfa longifolia
Dactylis Glomerata

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

GRAMINEAE (cont.)
Distichlis stricta
Echinochloa crusgalli
Elymus ambiguus
Eragrostis perplexa
Eriochloa gracilis
Hordeum jubatum
Koeleria cristata
Lolium perenne
Muhlenbergia asperifolia
Muhlenbergia filiculmis
Muhlenbergia squarrosa
Muhlenbergia torreyi
Muhlenbergia minutissima
Munroa squarrosa
Oryzopsis hymenoides
Oryzopsis micrantha
Panicum capillare
Panicum miliaceum
Panicum virgatum
Phalaris arundinacea
Phleum alpinum
Phleum pratensis
Poa fendleriana
Poa palustris
Poa interior
Poa pratensis
Polypogon monspeliensis
Puccinella fasciculata
Redfieldia flexuosa
Setaria viridis
Sitanion hystrix
Sporobdus airoides
Sporobdus cryptandrus
Stipa comata
Stipa viridula
Triticum aestivum
Trisetum montanum

GROSSULARIACEAE
Ribes americanum
Ribes aureum
Ribes cereum
Ribes inerme

HALORAGIDACEAE
Myriophyllum exalbescens

HYDROPHYLLACEAE
Hydrophyllum fendleri
Phacelia neomexicana
Phacelia sericea
Phacelia submutica

IRIDACEAE
Iris missouriensis
Iris germanica
Sisyrinchium angustifolium

JUNACEAE
Juncus balticus
Juncus dudleyi
Juncus ater balticus montanus
Juncus saximontanus

JUNCAGINACEAE
Triglochin maritima

LABIATAE
Dracocephalum parvifolium
Lycopus americanus
Marrubium vulgare
Mentha arvensis
Mentha spicata
Monarda pectinata
Nepeta cataria
Prunella vulgaris

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

LABIATAE (cont.)
Scutellaria brittonii
Stachys palustris
Teucrium canadense

LEGUMINOSAE
Astragalus agrestis
Astragalus eucosmus
Astragalus ceramicus
Astragalus flexuosus
Astragalus bentatus
Astragalus goniatus
Astragalus halli
Astragalus hysopyfalius
Astragalus ripleyi
Caragana aborescens
Dalea alopecuroides
Glycerrhiza lepidata
Lathrus eucosmos
Lathrus leucathus
Lupinus ammophilus
Lupinus pusillus
Medicago lupulina
Medicago sativa
Melilotus alba
Melilotus officinalis
Oxytropis deflexa
Oxytropis labertii
Oxytropis retrorsa
Oxytropis sericea
Phaseolus vulgaris
Psoralea digitata
Psoralea lanceolata
Robinia neomexicana
Thermopsis divaricarpa
Thermopsis montana

LEMNACEAE
Impatiens balsamina
Lemna minor

LILLIACEAE
Allium cepa
Allium cernuum
Allium antivum
Allium geyeri
Asparagus officionalis
Calochortus gunnisoonii
Smilacina racemosa
Smilacina stellata
Veratum speciosum
Yucca glauca
Zygadenus elegans

LINACEAE
Linum lewissi
Linum usitatissiaum

LOASACEAE
Mentzelia albicaulis
Mentzelia multiflora
Mentzelia nuda

LOGANIACEAE
Gelsemium sempevirens

MALVACEAE
Althaea rosea
Callirhoe alcaeoides
Calirhoe involucrata
Malva rotundifolia
Sidalcea candida
Sidalcea neomexicana
Sp. haeralacea coccinea

MORACEAE
Morus rubra

NAJADACEAE
Potamogeton folisus
Ruppia maritina

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

NAJADACEAE (cont.)
Zannichellia palustris

NYCTAGINACEAE
Mirabilis lineris
Mirabilis multiflora
Mirabilis oxybaphoides
Tripterocalyx micranthus

OLEACEAE
Fraxinum pennsylvanicus
Syringa josikaea
Syringa persica
Syringa vulgaris

ONAGRACEAE
Epilobium adenocaulon
Epilobium angustifolium
Epilobium hornemanni
Epilobium glandulosum
Epilobium lactiflorum
Epilobium paniculatum
Gaura coccinea
Gayophytum sp.
Oenothera albicaulis
Oenothera caespitosa
Oenothera coronopifolia
Oenothera hookeri
Oenothera labicaulis
Oenothera strigosa

ORCHIDACEAE
Calypso bulbosa
Coralorhiza maculata
Habenaria hyperborea

OROBANCHAEAE
Orobanche multiflora

PAPAVERACEAE
Argemone platyceras
Corydalis aurea
Corydalis brandegei
Eschscholtzia californica
Eschscholtzia mexicana

PINACEAE
Abies concolor
Abies lasiocarpa
Juniperus communis
Juniperus scopulorum
Picea engelmanni
Picea pugens
Psuedotsuga menzisii
Pinus edulis
Pinus artistata
Pinus contorta var. latifolia
Pinus flexilis
Pinus ponderosa scopulorum

PLANTAGINACEAE
Plantago lanceolate
Plantago major

POLEMONIACEAE
Collumia linearis
Gilia aggregata
Gilia calcarea
Gilia greensana
Gilia longiflora
Gilia laxiflora
Gilia scariosa
Leptodactylon pungens
Polemonium foliosissimum

POLYGONACEAE
Eriogonum alatum

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

POLYGONACEAE (cont.)
Ericgonum cernuum
Eriogonum effusum
Eriogonum flavum
Eriogonum jamesii
Eriogonum racemosum
Eriogonum umbellatum
Oxyria digyna
Polygonum amphibium
Polygonum aviculare
Polygonum bistortoides
Polygonum natans
Rheum rhoponticum
Rumex maritinus
Rumex mexicanus
Rumex persicarioides
Rumex venosus
Rumex sp.
Rumex crispa

PORTULACEAE
Claytonia megarrhiza
Portulaca oleacea

POTAMOGETONACEAE
Potamogeton foliosus
Potamogeton gramineus
Potamogeton natans
Potamogeton nodosus
Potamogeton pusillus

PRIMULACEAE
Androsace spetentrionalis
Dodecaetheon pauciflorum
Dodecaetheon radicatum
Dodecaetheon meadia
Primula parryi

PYROLACEAE
Pyrola secunda
Pyrola minor
Pyrola elliptica

RANUNCULACEAE
Aquilegia canadensis
Aquilegin coerulea
Aconitum columbianum
Actaea spicata
Anemone glosbosa
Anemone multifida
Anemone patens
Caltha leptosepala
Clematis jackmani
Clematis hirsutissima
Clematis linguistioifolia
Clematis pseudoalpina
Clematis virginiana
Delphinium nelsonii
Ranunculus aquatilis
Ranunculus cymbalaria
Ranunculus macounii
Ranunculus pedatifidus
Ranunculus trichophyllus
Pulsatilla ludoviciana
Thalictrum fendleri

ROSACEAE
Amelanchier alnifolia
Amelanchier pulima
Bossekia deliciosa
Cercocarpus montanus
Cotoneaster acutifolia
Crataegus rivularis
Fallugia paradoxa
Fragaria annassa
Fragaria gluaca
Fragaria ovalis
Geum rossii
Holodiscus dumosus
Physocarpus monogynus
Potentilla anserina
Potentilla argentina
Potentilla fruticosa
Potentilla gracilis
Potentilla hippiana

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

ROSACEAE (cont.)
Potentilla intermedia
Potentilla norvegica
Potentilla pennsylvanica
Potentilla pennsylvanica var.
Potentilla plattensis/bipinnatifida
Potentilla pulcherrima
Prunus virginiana
Pyrus ioensis
Rosa scicularis
Rosa nutkans
Rosa woodsii
Rubus deliciousus
Rubus idaeus
Rubus idaeus var. strigosus
Philadelphus virginalis
Sibbaldia procumbens
Sorbus scopulina
Sorbus bumalda

THAMINACEAE
Rhamour cathartica

RUBIACEAE
Galium boreale .

SALICACEAE
Populus acuminata
Populus angustifolia
Populus alba var. Bolleana
Populas sargentii
Populus nigra var. Italica
Populus tremuloides
Salix amygdaloides
Salix bebiana var. perrostrata
Salix babylonica
Salix exigua
Salix caudata
Salix drummoniana
Salix lasiandra
Salix pseudomonticola
Salix wordi

SANTALACEAE
Comandra pallida

SACIFRAGACEAE
Heuchera sanguinea
Heuchera parvifolia
Jamesia americana
Ribes aureum
Ribes cereum
Ribes lepthanthum
Ribes inebrians
Saxifraga bronchialis

SCROPHULARIACEAE
Antirrhinum majus
Castilleja integra
Castilleja linariae folia
Castilleja miniata
Castilleja occidentalis
Castilleja pallescens
Castilleja septentrionalis
Castilleja sulphureus
Gratiola neglecta
Mimulus glabratus
Mimulus guttatus
Orthocarpus letueus
Pedicularis groenlandica
Pedicularis racemosa
Pedicularis crenulata
Penstemon angustifolius
Penstemon barbatus
Penstemon caudatus
Penstemon rydbergii
Penstemon unilateralis
Penstemon whippleanus
Penstemon jamesi
Penstemon torreyii
Linarria vulgaris
Scrophularia lanceolate

TABLE 1-A. ADAMS STATE COLLEGE PRELIMINARY LIST OF VASCULAR PLANTS OF THE SAN LUIS VALLEY (cont.)

SCROPHULARIACEAE (cont.)
Verbascum thapsus

SELAGINELLACEAE
Selaginella standleyi

SOLAMACEAE
Solanum nigrum
Solanum triflorum
Solanum tuberosum
Hyoscyamus niger
Petunia hybrida
Solanum rostratum

TYPHACEAE
Typha latifolia
Typha angustifolia

TAMARICACEAE
Tamarix odessana
Tamarix pentranda

TROPALOLACEAE
Tropaelum majus

ULMACEAE
Celtis occidentalis
Ulmus americana
Ulmus pumila

UMBELLIFERAE
Anethum graveolens
Cicuta occidentalis
Cymopterus acaulis
Daucus carota
Harbouria trachypleura
Heracleum lanatum
Oreosix aplina
Petroselinum crispum
Pseudocymopterus montanus
Rheum thaponticum
Urtica dioica
Uritica gracilis

VALERIANACEAE
Valeriana capitata
Valeriana ceratophylla
Valeriana edulis

VERBENACEAE
Verbena bracteata
Vergena bastata
Verbena stricta

VIOLACEAE
Viola rugulosa
Viola canadensis
Viola tricolor var. hortensis
Viola sp.

VITACEAE
Parthenocissus quinqufolia
Vitis vinifera

ZOSTERACEAE
Potamogeton folisus
Potamogeton nodosus
Ruppia maritima
Zanichellia palustris

APPENDIX 3.

WILDLIFE

Figure 3-A	Checklist of the Terrestrial Fauna in the San Luis Valley
Figure 3-B	Correspondence Regarding Black-Footed Ferret Inventory Work in the San Luis Valley

FIGURE 3-A.

CHECKLIST OF THE TERRESTRIAL FAUNA IN THE SAN LUIS VALLEY

The checklist that follows contains all the terrestrial vertebrate wild animals which are found in the San Luis Valley of Colorado and those terrestrial invertebrates which are considered important to the valley's economy or to domestic livestock grazing. Soil microorganisms are omitted from the checklist since they are summarized in the main text. The following codes are used in the list to indicate the relative abundance of all vertebrates and the seasonal status of the birds.

Abundance of Vertebrates

c = Common

u = Uncommon

r = Rare

Seasonal Status for Birds

M = Migrant

R = Permanent resident

S = Summer resident

W = Winter resident

* - Nesting bird

FIGURE 3-A (cont.)
INVERTEBRATES

Common Name	Scientific Name	Importance
	Phylum Nematoda	
lungworm	Protostrongylus stilesi	bighorn sheep parasite
	Phylum Mollusca	
land snails	Vallonia pulchalla)	(intermediate host for
land snails	Papilla blandi)	(bighorn sheep lungworm
	Phylum Arthropoda	
hard ticks	Dermacentor spp)	(biting pests and
mosquitoes	Family Culicidae)	(disease vectors
black flies	Family Simulidae)	(" "
horseflies	Family Tabanidae)	(" "
biting midges ("no-see-ums")	) Family Ceratopogonidae)	((" "
botflies	Family Oestridae)	(parasite of livestock
warble flies	Family Hypodematidae)	(and big game
horse botflies	Family Gasterophilidae)	(" "
range caterpillar	Family Formicidae	consume and damage grass
western harvester ant	Family Formicidae	destroy plants around mounds
termites	Order Isoptera	break down dead wood and foliage
aphids and leafhoppers	Order Homoptera)	(feed on sap-damage
true bugs	Order Hemiptera)	(plants
grasshoppers and crickets	Order Orthoptera	Consume and damage foliage
beetles	Order Coleoptera	many are herbivorous
tiger beetle	Cicindela fermosa	endemic to Sand Dunes area

FIGURE 3 A (cont.)

REPTILES

Common Name	Scientific Name	Abundance/Habitat Preference	
Eastern fence lizard	Sceloporus undulatus	u	Area wide
Short horned lizard	Phrynosoma douglassi	c	Dry sandy areas
Many-lined skink	Eumeces multivirgatus	u	Areas of moist subsoil
Gopher snake	Pituophis melanoleucas	c	Area wide
Milk snake	Lampropeltis triangulum	r	Nearly all habitat types
Common garter snake	Thamnophis sirtalis	c	Near water
Western terrestrial garter snake	Thamnophis elegans	u	Usually near water
Western rattle snake	Crotalus viridus	u	Rocky areas

MAMMALS

INSECT-EATERS	INSECTIVORA		
Shrews	Soricidae		
Masked shrew	Sorex cinereus	r	Moist forests and brushlands
Merrian shrew	Sorex merriami	r	Arid grass and brushlands
Vagrant shrew	Sorex vagrans	u	Marshes, bogs, streamsides
Dwarf shrew	Sorex nanus	r	Moist coniferous forests
Water shrew	Sorex palustris	u	Forested streams and bogs

FIGURE 3 -A (cont.)

Common Name	Scientific Name	Abundance/Habitat Preference	
BATS	CHIROPTERA		
Plainnose bats	Vespertilionidae		
Little brown myotis	Myotis lucifugus	c	Caves, hollow trees, buildings
Cave myotis	Myotis velifer	r	Caves, buildings
Fringed myotis	Myotis thysanodes	r	Caves, buildings
California myotis	Myotis californicus	r	Hollow trees and crevices
Long-legged myotis	Myotis volans	u	Crevices in rocky ledges
Small-footed myotis	Myotis subulatus	u	Trees, hollow trees, caves, buildings
Silver-haired bat	Lasionycteris noctivagans	u	Forested areas
Big brown bat	Eptesicus fuscus	c	Caves, crevices, buildings
Hoary bat	Lasiurus cinereus	u	Wooded areas
Western big-eared bat	Plecotus townsendi	u	Caves & buildings
Pallid bat	Antrozous pallidus	r	Trees, crevices, buildings
Freetail bats	Molossidae		
Big freetail bat	Tadarida molossa	r	Caves & buildings
Mexican freetail bat	Tadarida brasiliensis	r	Caves, crevices, buildings
PIKAS, RABBITS & HARES	LAGOMORPHA		
Pikas	Ochotonidae		
Pika	Ochotona princeps	u	Talus slopes, rock slides in high country

FIGURE 3 -A (cont.)

Common Name	Scientific Name	Abundance/Habitat Preference	
Hares and Rabbits	Leporidae		
Snowshoe hare	Lepus americanus	u	Forested mountains and foothills
Whitetail jackrabbit	Lepus townsendii	c	Open grass and brushy plains
Blacktail jackrabbit	Lepus californicus	c	Brushy and grassy plains
Desert cottontail	Sylvilagus auduboni	c	Open plains, pinon, brushlands
Mountain cottontail	Sylvilagus nuttalli	c	Brushy rocky slopes & forests
RODENTS	RODENTIA		
Squirrels	Sciuridae		
Yellowbelly marmot	Marmota flaviventris	u	Rocky slopes
Gunnison's prairie dog	Cynomys gunnisoni	c	Open mountain valleys
Thirteen-lined ground squirrel	Spermophilus tridecemlineatus	u	Short grass prairies
Rock squirrel	Spermophilus variegatus	u	Rocky canyons
Golden-mantled ground squirrel	Spermophilus lateralis	c	Mountain areas
Least chipmunk	Eutamias minimus	c	Brushy deserts, conifers
Colorado chipmunk	Eutamias quadrivittatus	u	Coniferous forest
Red squirrel	Tamiasciurus hudsonicus	u	Coniferous forest
Tassel-eared squirrel (Abert squirrel)	Sciurus aberti	r	Ponderosa pine forests

FIGURE 3-A (cont.)

Common Name	Scientific Name	Abundance/Habitat Preference	
Pocket Gophers	Geomyidae		
Botta pocket gopher	Thomomys bottae	u	Valleys & mountain meadows
Northern pocket gopher	Thomomys talpoides	c	Prairies, mountain meadows, pine forests
Pocket Mice and Kangaroo Rats	Heteromyidae		
Ord's kangaroo rat	Dipodomys ordi	c	Arid sandy soils
Silky pocket mouse	Perognathus flavus	u	Shortgrass prairies, sandy soil
Apache pocket mouse	Perognathus apache	u	Sparse brush, scattered juniper and pines
Beavers	Castoridae		
Beaver	Castor canadensis	c	Streams or lakes with trees
Plains harvest mouse	Reithrodontomys montanus	u	Upland prairies
Western harvest mouse	Reithrodontomys megalotis	u	Grassland weedy areas near water
Deer mouse	Peromyscus maniculatus	c	All dryland habitats
Brush mouse	Peromyscus boylei	u	Arid rocky brushland
Rock mouse	Peromyscus difficilis	r	Rocky outcrops & talus slopes
Pinon Mouse	Peromyscus truei	u	Rocky areas of pinon & juniper
Northern Grasshopper mouse	Onychomys leucogaster	c	Open brush or grassland

FIGURE 3 -A (cont.)

Common Name	Scientific Name	Abundance/Habitat Preference	
Mexican woodrat	Neotoma mexicana	u	Mountainous Rocky Areas
Bushytail woodrat	Neotoma cinerea	c	Rocky open forest
Boreal redback vole	Clethrionomys grapperi	c	Damp coniferous forests
Meadow vole	Microtus pennsylvanicus	c	Grasslands near stream, lakes
Montane vole	Microtus montanus	c	Brushlands of mountain valleys
Longtail vole	Microtus longicaudus	c	Streambanks and mountain valleys
Muskrat	Ondatra zibethica	c	Marshes, streams, lakes
Old World Rats and Mice	Muridae		
House mouse	Mus musculus	c	Usually around habitation
Jumping Mice	Zapodidae		
Western jumping mouse	Zapus princeps	u	Dense grasslands near streams
New World Porcupines	Erethizontidae		
Porcupine	Erethizon dorsatum	c	Usually forests occasionally brushland
FLESH-EATERS	CARNIVORA		
Foxes and Coyotes	Canidae		
Coyote	Canis Latrans	c	Area wide
Red Fox	Vulpes fulva	r	Forest to open country

FIGURE 3-A (cont.)

Common Name	Scientific Name	Abundance/Habitat Preference	
Gray fox	Urocyon cinereoargenteus	u	Open woodlands river bottoms
Kit fox	Vulpes macrotis	r	Open arid sandy areas
Bears	Ursidae		
Black bear	Ursus americanus	u	Remote mountainous areas, forests
Raccoons and Ringtails	Procyonidae		
Raccoon	Procyon lotor	c	Along heavily wooded stream or lakesides
Ringtail	Bassariscus astutus	r	Rocky brushy ridges near water
Weasels, Skunks, Badgers, etc.	Mustelidae		
Marten	Martes americana	u	Fir and spruce forests
Shorttail weasel (Ermine)	Mustela erminea	r	Brushy or wooded areas near water
Longtail weasel	Mustela frenata	c	All terrestrial habitats
Black-footed ferret	Mustela nigripes	**	Prairies around prairie dog colonies
Mink	Mustela vison	u	Riparian woodlands
Badger	Taxidea taxus	u	Open grasslands, foothills, deserts
Spotted skunk	Spilogale putorius	u	Brushlands or open woods near water
Striped skunk	Mephitis mephitis	c	Farmland, brushland, deserts

** - Endangered Species - Presence is not confirmed.

Common Name	Scientific Name	Abundance/Habitat Preference	
Cats	Fedidae		
Mountain lion	Felis concolor	u	Remote mountains and forests
Bobcat	Lynx rufus	u	Rimrocks and brushlands, forests, riparian woodlands
EVEN-TOED UNGULATES	ARTIODACTYLA		
Deer and Allies	Cervidae		
Mule deer	Odocoileus hemionus	c	Open forests and brushland
Elk	Cervus canadensis	c	Open forests and mountain meadows
Pronghorn Antelope	Antilocapridae		
Pronghorn	Antilocapra americana	c	Mixed grassland and shrubland
Cattle, Sheep and Goats	Bovidae		
Bighorn sheep	Ovis canadensis	u	Open mountain slopes

FIGURE 3 -A (cont.)

BIRDS

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
LOONS	GAVIIFORMES		
Family: Gaviidae			
Common loon	Gavia immer	rW	Lakes and ponds
GREBES	PODICIPEDIFORMES		
Family: Podicipedidae			
Western grebe	Aechmophorous occidentalis	rS*	Lakes and ponds
Eared grebe	Podiceps caspicus	uS*	Lakes and ponds
Pied-billed grebe	Podilymbus podiceps	uS*	Lakes, ponds, rivers, marshes
PELICANS	PELICANIFORMES		
Family: Pelicanidae			
White pelican	Pelecanus erythrorhynchos	rM	Lakes and marshes
DUCKS AND GEESE	ANSERIFORMES		
Family: Anatidae			
Whistling swan	Olor columbianus	rM	Lakes and rivers
Canada goose	Branta canadensis	cR*	Lakes, streams marshes, fields
White fronted goose	Anser albifrons	rM	Lakes, streams, marshes, fields
Snow goose	Chen hyperborea	rM	Lakes, streams,
Ross' goose	Chen rossi	rM	Lakes, streams, marshes, fields
Mallard	Anas platyrhynchos	cR*	Lakes, streams, marshes, fields
Pintail	Anas acuta	cR*	Lakes, streams, marshes, fileds
Gadwall	Anas strepera	cS*	Lakes, streams, marshes

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Blue-winged teal	*Anas discors*	cS*	Lakes, Streams, marshes
Green-winged teal	*Anas carolinensis*	cR*	Lakes, streams, marshes
Cinnamon teal	*Anas cyanoptera*	cS*	Lakes, streams, marshes
American wigeon	*Mareca americana*	uS*	Lakes, streams, marshes
Northern shoveler	*Spatula clypeata*	cS*	Lakes, streams, marshes
Wood duck	*Aix sponsa*	rM	Wooded rivers, marshes, lakes
Redhead	*Aythya americana*	uS*	Marshes & lakes
Canvasback	*Aythya valisineria*	rM	Marshes & lakes
Ring-necked duck	*Aythya collaris*	rM	Marshes & lakes
Greater scaup	*Aythya marila*	rM	Marshes & lakes
Lesser scaup	*Aythya affinis*	uM	Marshes & lakes
Common goldeneye	*Bucephala clangula*	rM	Marshes, lakes, rivers
Bufflehead	*Bucephala albeola*	uM	Marshes, lakes, rivers
Ruddy duck	*Oxyura jamaicensis*	uS*	Marshes & lakes
Common merganser	*Mergus merganser*	uM	Marshes, lakes, rivers
Red-breasted merganser	*Mergus serrator*	rM	Lakes and ponds
Hooded merganser	*Lopholytes eucullatus*	rM	Wooded lakes, ponds, & rivers
EAGLES, HAWKS, FALCONS and VULTURES	FALCONIFORMES		
Family: Cathartidae			
Turkey vulture	*Cathartes aura*	uS	Open brush and grasslands

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Family: Accipitridae			
Goshawk	Accipter gentilis	uR*	Forests and woodlands
Sharp-shinned hawk	Accipter striatus	uM	Forests and woodlands
Cooper's hawk	Accipter cooperii	uM	Broken Woodlands and canyons
Marsh hawk	Circus cyaneus	cR*	Marshes, fields, brushlands
Routh-legged hawk	Buteo lagopus	cW	Open rangelands
Ferruginous hawk	Buteo regalis	rR*	Open rangelands
Red-tailed hawk	Buteo jamaicensis	uR*	Area wide
Swainson's hawk	Buteo swainsoni	cS*	Dry plains - open rangelands
Golden eagle	Aquila chrysaetos	cR*	Open rangelands and foothills
Bald eagle	Haliaeetus leucocephalus	cW	Open rangelands
Family: Falconidae			
Peregrine falcon	Falco peregrinus **	rR*	Open country
Prairie falcon	Falco mexicanus	uR*	Open rangelands and plains
Merlin (pigeon hawk)	Falco columbarius	rM	Open woodlands, prairies
American kestrel (sparrow hawk)	Falco sparverius	cR*	Open brushland and prairies
GALLINACEOUS BIRDS	GALLIFORMES		
Family: Tetraonidae			
Sage grouse	Centrocercus uronphasianus	Rr*	Sagebrush plains
Blue grouse	Dendragapus obscurus	uR*	Aspen & coniferous forests

** - Endangered Species - No recent nesting records on NRL

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Family: Phasianidae			
Ring-necked pheasant	Phasianus colchicus	uR*	Farmlands and brushlands
Chukar	Alectoris gracea	rR*	Rocky, grassy dry slopes
Gray (Hungarian) partridge	Perdix perdix	rR*	Open grasslands or farmlands
Family: Meleagrididae			
Wild turkey	Meleagris gallopavo	rR*	Pine forests, broken woodlands
HERONS, BITTERNS and ALLIES	CICONIIFORMES		
Family: Ardeidae			
Great egret	Casmerodious albus	rM	Marshes, ponds, shorelines
Snowy egret	Leucophoyx thula	cS*	Marshes, ponds shorelines
Great blue heron	Ardea herodias	uS	Marshes and ponds, shorelines
Black-crowned night heron	Nycticorax nycticorax	cS*	Marshes, lake margins
American bittern	Botaurus lentiginosus	uS*	Marshes
Least Bittern	Ixobrychus exilis	rS	Marshes
Family: Threskiornithidae			
White-faced ibis	Pelgadis chihi	uS*	Marshes and lake margins
CRANES, RAILS and ALLIES	GRUIFORMES		
Family: Gruidae - Cranes			
Sandhill crane	Grus canadensis	cM	Prairies, meadows, margins
Family: Rallidae			
Virginia rail	Rallus limicola	uS*	Marshes

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Sora	Porzana carolina	uS*	Marshes, wet meadows
American coot	Fulica americana	cS*	Ponds, lakes, marshes
SHOREBIRDS AND GULLS	CHARADRIFORMES		
Family: Recurviorstridae Avocets and Stilts			
American avocet	Recurvirostra americana	cS*	Marshes, mudflats, alkaline ponds
Black-necked stilt	Himantopus himantopus	rM	Grassy marshes, shallow lakes
Family: Charadriidae - Plovers			
Mountain plover	Eupoda montanus	rS*	Semi-arid grassland
Black-bellied plover	Squatarola squatarola	rM	Open marshes
Killdeer	Charadrius vociferus	cR*	Farmlands, gravel shores, riverbanks
Snowy plover	Charadrius alexandrinus	uS*	Marshes, pond edges
Family: Scolopacidae			
Long-billed curlew	Numenius americanus	rM	Wet meadows, marshes
Marbled godwit	Limosa fedoa	uM	Prairies, pond shorelines, wet meadows
Solitary sandpiper	Tringa solitario	uM	Marshes and streamsides
Spotted sandpiper	Actitis macularia	cS*	Pond shores, streamsides
Willet	Catoptrophorus semipalmatus	uM	Marshes, wet meadows
Greater yellowlegs	Totanus melanoleucas	cM	Open marshes, mudflats
Lesser yellowlegs	Totanus flavipes	cM	Marshes, mudflats, ponds
Long-billed dowitcher	Limnodromus scolopaceus	uM	Mudflats, marshes

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Baird's Sandpiper	Erolia bairdii	uM	Ponds, mudflats, shores
Least sandpiper	Erolia minutilla	cM	Grassy marshes
Western sandpiper	Ereunetes mauri	cM	Mudflats, open marshes
Common snipe	Capella gallinago	uR*	Wet meadows, streamsides
Family: Phalaropidae			
Wilsons phalarope	Steganopus tricolor	cS*	Wet meadows, marshes
Northern phalarope	Lobipes lobatus	rM	Lakes and ponds
Family: Laridae			
Ring-billed gull	Larus delawarensis	uM	Refuse dumps, Lakes, farmlands
Franklin's gull	Larus pipixcan	uM	Wet prairies, marshes, lakes
Least tern	Sterna albifrons	rM	Marshes and lakes
Common tern	Sterna hirundo	rM	Lakes and ponds
Forster's tern	Sterna forsteri	rM	Marshes and ponds
Caspian tern	Hydroprogne caspia	rM	Lakes
Black tern	Childonias nigra	uM	Marshes and ponds
PIGEONS and DOVES	COLUMBIFORMES		
Family Columbidae			
Band-tailed pigeon	Columba fasciata	uS*	Pine forests, grainfields, open foothills
Rock Dove	Columba livia	cR*	Farms, cities - near buildings
Mourning dove	Zenaidura macroura	cR*	Area wide

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference
CUCKOOS and ROADRUNNERS		
Family: Cuculidae		
Roadrunner	Geococcyx californianus	rR Dry brushlands, open pinon-juniper
OWLS	STRIGIFORMES	
Family: Tytonidae		
Barn owl	Tyto alba	rR* Riparian woodlands, farms
Family: Strigidae		
Screech owl	Otus asio	rR* Woodlands
Great horned owl	Bubo virginianus	cR* Area wide
Long-eared owl	Asio otus	uR* Riparian woodlands and forests
Short-eared owl	Asio flammeus	uR* Prairies and brushlands
Spotted owl	Strix occidentalis	rR* Dense forests
Burrowing owl	Speotyto cunicularia	uS* Open grass and brushlands
Saw-whet owl	Aegolius acadicus	rR* Coniferous forests
Flammulated owl	Otus flammeolus	rR* Open pine forests
Pygmy owl	Glaucidium gnoma	rR* Open coniferous forests
NIGHTHAWKS and POOR-WILLS	CAPRIMULGIFORMES	
Family: Caprimulgidae		
Poor-will	Phalaenoptilus nuttalli	uS* Open pinon-juniper
Common nighthawk	Cordeiles minor	cS* Area wide

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
HUMMINGBIRDS and SWIFTS	APODIFORMES		
Family: Apodidae			
Black swift	Cypseloides niger	rS	Open sky of mountain country, cliffs
White-throated swift	Aeronautes saxatalis	uS*	Open sky, cliffs
Family: Trochilidae			
Broad-tailed hummingbird	Selasphorus platycercus	cS*	High meadows, willows
Calliope hummingbird	Stellula calliope	uS*	High mountains, flowered meadows
Black-chinned hummingbird	Archilochus alexandri	rS	Woodlands near water
Rufous hummingbird	Selasphorus rufus	cM	Forest edges
KINGFISHERS	CORACIIFORMES		
Family: Alcedinidae			
Belted kingfisher	Megaceryle alcyon	uS*	Along rivers, ponds, lakes
WOODPECKERS	PICIFORMES		
Family: Picidae			
Common flicker	Colaptes sp.	cR*	Forests, riparian woodlands, pinon-juniper
Red headed woodpecker	Melanerpes erythrocephalus	rM	Riparian woodlands
Lewis' woodpecker	Asyndesmus lewis	cS*	Open forests
Yellow-bellied sapsucker	Sphyrapicus varius	cS*	Woodlands, orchards
Williamson's sapsucker	Sphyrapicus thyroideus	uS*	Coniferous forests
Hairy woodpecker	Dendrocopos villosus	uR*	Riparian woodlands, mountain forests
Downy woodpecker	Dendrocopos pubescens	cR*	Riparian woodlands, forests

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Northern three-toed	Piciodes Tridactylus	rR*	Coniferous forests
PERCHING BIRDS	PASSERIFORMES		
Family: Tyrannidae			
Eastern Kingbird	Tyrannus tyrannus	rM	Roadsides, farmlands
Western kingbird	Tyrannus verticalis	uS*	Open country with scattered trees
Cassins kingbird	Tyrannus vociferans	rM	Semi-open woodlands
Ash-throated flycatcher	myiarchus cinerascens	rM	Pinon-juniper, brushlands
Say's phoebe	Sayornis saya	cS*	Prairies and open brushlands
Hammond's flycatcher	Empidonax hammondii	rS	High coniferous forests
Dusky flycatcher	Empidonax oberholseri	rS	Pinon-juniper
Western flycatcher	Empidonax difficilis	uS*	Moist, shaded woodlands
Western wood pewee	Contopus sordidulus	uS*	River groves, open conifers
Olive-sided flycatcher	Nuttallornis borealis	uS*	Coniferous forests
Family: Alaudidae			
Horned lark	Eremophila alpestris	cR*	Plains and open brushlands
Family: Hirundinidae			
Barn swallow	Hirundo rustica	cS*	Marshes, fields, usually near habitation
Cliff swallow	Petrocheiidon pyrrhonota	cS*	Open land near cliffs and water

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Violet-green swallow	*Tachycineta thalassina*	cS*	Wooded foothills and mountains
Tree swallow	*Iridoprocne bicolor*	uS*	Open country near water
Bank swallow	*Riparia riparia*	uS*	Stream and river banks
Rough-winged swallow	*Stelgidopteryx ruficollis*	uS*	Near streams and lakes
Purple martin	*Progne subis*	rM	Open farmlands to forests
Family: Corvidae			
Stellar's jay	*Cyanocitta stellari*	cR*	Coniferous forests
Scrub jay	*Aphelocoma coerulescens*	uR*	Pinon-juniper brushland
Pinyon jay	*Gymnorhinus cyanocephalus*	cR*	Pinon-juniper
Gray jay	*Perisoreus canadensis*	cR*	Coniferous forests
Black-billed magpie	*Pica pica*	cR*	Brushlands, riparian woodlands
Clark's nutcracker	*Nucifraga columbiana*	cR*	High coniferous forests
Common raven	*Corvus corax*	uR*	Area wide
Common crow	*Corvus brachyrhynochos*	uR*	Farmlands, brushlands, riparian woodland
Family: Paradae			
Black-capped chickadee	*Parus atricapillus*	uR*	Mixed and deciduous woodlands
Mountain chickadee	*Parus gambeli*	cR*	Coniferous forests
Plain titmouse	*Parus inornatus*	uR*	Pinon-juniper riparian woods
Verdin	*Auriparus flavicens*	rM	Semi-arid brushlands

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Bushtit	Psaltriparus minimus	uR*	Pinon-juniper
Family: Cinclidae			
Dipper	Cinclus mexicanus	uR*	Fast flowing mountain streams
Family: Sittidae			
White-breasted nuthatch	Sitta carolinensis	uR*	Riparian woods, mixed forests
Red-breasted nuthatch	Sitta canadensis	rR*	Coniferous forests
Pygmy nuthatch	Sitta pygmaea	uR*	Pine and Douglas fir forests
Family: Certhiidae			
Brown creeper	Certhia familiaris	uR*	Forests and woodlands
Family: Troglodytidae			
House wren	Troglodytes aedon	uS*	Brushlands and open woodlands
Bewick's wren	Thyromanes bewickii	uS*	Brushlands and pinon-juniper
Rock wren	Salpinctes obsoletus	cS*	Talus slopes, cliffs
Canyon wren	Catherpes mexicanus	rS*	Rocky canyons, cliffs
Long-billed marsh wren	Telmatodytes plaustris	cR*	Marshes, tules, cattails
Short-billed marsh wren	Cistothorus plantensis	rM	Grassy marshes sedges
Family: Mimidae			
Mockingbird	Mimus polyglottos	uS*	Riparian woodlands, roadsides
Catbird	Dumetella carolinensis	uS*	Dense brushlands
Brown thrasher	Toxostoma rufum	rW	Dense brushlands

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Sage Thrasher	Oreoscoptes montanus	cS*	Desert Brushlands
Family: Turdidae			
American robin	Turdus migratorius	cS*	Open woodlands, farmlands, streamsides
Townsend's solitaire	Myadestes townsendi	cR*	Mixed forest
Hermit thrush	Hylochichla guttata	uS*	Coniferous or mixed forest
Swainson's thrush	Hylochichla ustulata	uS*	Aspens, coniferous forests, streamsides
Veery	Hylochichla fuscescens	rS*	Riparian woodlands
Western bluebird	Sialia mexicana	uS*	Scattered woodlands
Mountain bluebird	Sialia currucoides	uS*	Open brush and grassland
Family: Sylviidae			
Blue-gray gnatcatcher	Polioptila caerulea	uS*	Pinon-juniper, riparian woods
Golden-crowned kinglet	Regulus satrapa	rR*	Coniferous forest
Ruby-crowned kinglet	Regulus calendula	uR*	Coniferous forest
Family: Motacillidae			
Water pipit	Anthus spinoletta	uR*	Wet meadows, plains, barefields
Family: Bombycillidae			
Bohemian waxwing	Bombycilla garrula	uW	Boreal forests
Cedar waxwing	Bombycilla cedrorum	uW	Open woodlands
Family: Laniidae			
Northern Shrike	Lanius excubitor	uW	Brushlands, forests
Loggerhead shrike	Lanius ludovicianus	cS*	Scattered woodlands, brushlands

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Family: Sturnidae			
Starling	Sturnus vulgaris	cR*	Near habitation
Family: Vireonidae			
Solitary vireo	Vireo solitarius	rM	Mixed forests
Warbling vireo	Vireo gilvus	uS*	Mixed woodlands
Family: Parulidae			
Orange-crowned warbler	Vermivora celata	uM	Brush woodlands
Virginia's warbler	Vermivora virginiae	uM	Pinons, brush slopes
Yellow warbler	Dendroica petechia	cS*	Willows, riparian woodlands
Yellow-rumped warbler (Audubon's)	Dendroica Sp.	cM	Coniferous forests
Townsend's warbler	Dendroica townsendi	rM	Moist coniferous forests
Black-throated gray warbler	Dendroica nigrescens	uS*	Dry pinon-juniper slopes
Common yellow throat	Geothlypis trichas	cS*	Thickets, streamsides, marshes
Yellow-breasted chat	Icteria virens	rS*	Riparian woodlands
Northern waterthrush	Seiurus noveboracensis	rM	Wooded lake or stream shores
McGillivray's warbler	Oporornis tolmiei	uS*	Riparian thickets
Wilson's warbler	Wilsonia pusilla	uS*	Riparian thickets
American redstart	Setophaga ruticilla	rM	Deciduous woods cottonwoods
Family: Ploceidae			
House sparrow	Passer domesticus	cR*	Near habitation

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and	Habitat Preference
Family: Icteridae			
Bobolink	Dolichonyx oryzivorus	rS	Hay Meadows, marshes
Western meadow lark	Sturnella neglecta	cR*	Open Fields and rangelands
Yellow-headed blackbird	Xanthocephalus xanthocephalus	cS*	Marshes, wet meadows
Red-winged blackbird	Agelaius phoeniceus	cR*	Marshes, wet meadows
Brewer's blackbird	Euphagus cyanocephalus	cS*	Open grasslands, farmlands
Brown-headed cowbird	Molothrus ater	uS*	Barnyards, fields, woodland edges
Northern oriole	Icterus sp.	uS*	Riparian woodlands
Common grackle	Quiscalus quiscula	rS*	Streamsides and farmlands
Family: Thraupidae			
Western tanager	Piranga ludoviciana	uS*	Open woodlands
Summer tanager	Piranga rubra	rM	Riparian woodlands
Family: Fringillidae			
Black-headed grosbeak	Pheucticus melanocephalus	uS*	Mixed forest
Evening grosbeak	Hesperiphona vespertina	rM	Coniferous forests
Blue grosbeak	Guiraca caerulea	rM	Riparian thickets
Cassin's finch	Carpodacus cassinii	rR	Open coniferous forests
House finch	Carpodacus mexicanus	cR*	Open woodlands, buildings
Pine grosbeak	Pinicola enucleator	uR*	Coniferous forests
Gray-crowned rosy finch	Leucosticte tephrocotis	rW	Rocky alpine tundra

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Brown-capped rosy finch	Leucosticte australis	uR*	Rocky Alpine tundra
Pine siskin	Spinus pinus	uR*	Conifer forests, weedy areas
American goldfinch	Spinus tristis	uR*	Roadsides, weed-patches, riparian woodland
Lesser goldfinch	Spinus psaltria	rM	Riparian woodlands
Red crossbill	Loxia curvirostra	uR*	Coniferous forests
Green-tailed towhee	Chlorura chlorura	cR*	Brushlands, pinon-juniper
Rufous-sided towhee	Pipilo erythrophthalmus	uR*	Forest edges, brushlands
Brown towhee	Pipilo fuscus	rM	Pinon-juniper
Savannah sparrow	Passerculus sandwichensis	cS*	Meadows, marshes, prairies
Grasshopper sparrow	Ammodramus savannarum	rS	Grasslands, meadows
Baird's sparrow	Ammodramus bairdii	rS	Grasslamds. p½em brisj;amd
Lark bunting	Calamospiza melanocorys	uM	Prairies and brushlands
Vesper sparrow	Pooecetes gramineus	cS*	Open brushlands, fields
Lark sparrow	Chondestes grammacus	uS*	Open brushlands
Black-throated sparrow	Amphispiza bilineata	rM	Arid brushlands
Sage sparrow	Amphispiza belli	cS*	Greasewood and sagebrush
Rufous-crowned sparrow	Aimophila ruficeps	rM	Rocky grassy slopes
Cassin's sparrow	Aimophila cassinii	rM	Dry brushlands

FIGURE 3-A (cont.)

Common Name	Scientific Name	Status, Abundance, and Habitat Preference	
Dark-eyed junco	Junco sp.	cR*	Coniferous forests, riparian woodlands, mixed woodlands
Gray-headed junco	Junco caniceps	cR*	Forests
Tree sparrow	Spizella arborea	uW	Willow thickets and weedy areas
Chipping sparrow	Spizella passerina	cS*	Open woodlands
Brewer's sparrow	Spizella breweri	cS*	Brushlands, weeds
White-crowned sparrow	Zonotrichia leucophrys	cR*	Road sides, brushlands, pinon-juniper
Lincoln's sparrow	Melospiza lincolnii	uS*	Willow thickets
Swamp sparrow	Melospiza georgiana	rM	Marshes and brushy wetlands
Song sparrow	Melospiza melodia	cR*	Marshes, riparian woodlands
Lapland longspur	Calcarius lapponicus	rW	Meadows, farmlands and prairies
	Accidental Visitors		
Double-crested cormorant	Phalacocorax auritus		Lakes, rivers and ponds
Mexican duck	Anas diazi		Marshes, ponds, grainfields
White winged scoter	Melanitta deglandi		lakes and ponds
American woodcock	Philohela minor		Moist woodlands and moisture
Dunlin	Erolia alpina		Mudflats, ponds and lake edges
Vermillion flycatcher	Pyrocephalus rubinus		Riparian woodlands

FIGURE 3 -B. Correspondence Regarding Black-Footed Ferret Inventory Work in the San Luis Valley

Area Manager, Salt Lake City, Utah

Oct. 7, 1974

RECEIVED
USDI BLM
Alamosa, Colorado
NOV 20 1974

	Reqd	Act	Info
A.M.			KGC
NRS 1			
NRS 2			
NRS 3			
W.B.			
D.O.			
FILE			

State Supervisor, ADC, Denver, Co.

Black-footed ferret investigation report - Vic Keenan.

Attached are two copies of District Supervisor Keenan's report on his black-footed ferret investigations.

I believe that the animal Vic is seeing is a black-footed ferret, but proving what he is seeing is going to be difficult, at best.

Perhaps the observation Vic mentioned in the last paragraph is appropriate.

Durrell I. Cretz

cc: Tokkes

DON ZACCAGNINI
GARY SCHMOEGER ; Colo. DWL - Assisted in some of the night observation work.

Acting State Supervisor, ADC, Denver, Colo. July 8, 1974

District Supervisor, Monte Vista, Colo.

Black Footed Ferret Sightings and Captures in the San Luis Valley

Darrell, here are some of the notes on the ferrets. The Colorado DWL might be interested in this. They might have information that would go with what we have.

I will start the night checking as soon as I get the spotlight rigged. We should know by the end of the month whether we have anything or not. If I find anything for sure will give you a call.

[illegible] DFA Leyerly, September 1936. Trapping in Punchie Valley, using #2 New house traps and prairie dogs for bait. Had black foot in trap. Saved and later identified as a ferret. Same area as 7 & 8

2. DFA Leyerly, November 1936. Trapped two ferrets near little Mesita reservoir. Using #2 Newhouse traps and prairie dogs for bait. Saw another. Skinned the two and kept the skins for a period of time. Verified by District Supervisor John Crook. Presumed to be young of the year. Same area as 14, 1/2 mile west of 9 & 12.

3. District Supervisor John Crook accompanied by Lee Bacus. Summer 1946. Elk Park, west of South Fork. Sighted ferret in prairie dog town. Prairie dogs reported to be very excited-Bacus.

4. Norton R. Miner, District Supervisor, Monte Vista-1958. Found dead ferret near Crestone on Baca Grant in prairie dog town. Carcass dried out and partially decomposed. Picked up and identified. Kept remains in old shed for a period of time.

5. August 1959. Jim Reed and Howard Westbrook. La Jara reservoir area. Sighted ferret in prairie dog town northwest of cattle guard.

6. January 1962. DFA Broyles and District Supervisor Keenan. Alamosa river road. Nothh of Hot creek. Sighted snow tracks near prairie dog town. Looked like mink(?) but in sage brush area. This is near area where ferrets were reported later(1969 by sheepherders) in rock rim near Alamosa river north west of Capulin.

7. March 7, 1965. With DFA Broyles to Punchie valley. Four inches of new snow. Suspected ferret tracks east and south of Cove Lake reservoir. Same area as 1 & 8.

8. July 1965. With DFA Broyles to Punchie valley area. Suspected ferret den in area. Sandy and good tracking. No rain. Animals had moved and covered considerable area. One fourth mile or more from original site. Never rechecked. Same as 1 & 7.

FIGURE 3 -B (cont.)

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Ferrets (continued)

9. July 1966. To Mesita area. Reported ferret sighting by worker near pumice quarry. Same area as 12.

10. December 22, 1966. Tracks of two ferrets in prairie dog town in Little Mogote area. Found by DFA Broyles. Reported to me by phone at Chromo, Colo. Six inches of new snow.

11. December 29, 1966. To Little Mogote area to check tracks in snow with Broyles. Observed tracks and romping areas under sage brush. Animals had played in snow. Observed snow trench six feet long kicked out by suspected ferret. Took pictures.

12. September 1970. DFA Schmidt sighted two ferrets in prairie dog hole 1/2 mile north of pumice quarry at Mesita. Never came out of hole. Just heads sticking out. Appeared to be juveniles. Same area as 9, 1/2 mile east of 14 & 2.

13. January 1972. Howard Westbrook, Sanford. Accidental capture while trapping. Sighted two. (mature animals) near Eastdale Reservoir #1. South of Mesita. Male animal, with dark ventral stripe, about 14 to 15 inches long overall. Tail four or five inches with black tip. Black around eyes, black legs, tan body. Lighter color in forepart. Westbrook describes as about the size of small mink. Never skinned. Kept carcass for a time. 5 miles SE of 14 & 2.

14. November 1972. Howard Westbrook . Sighted two ferrets (juveniles) at little Mesita reservoir while checking trapline. Same as 2, 1/2 mile west of 9 & 12.

15. December 1972. Howard Westbrook. Sighted two ferrets (thought to be juveniles) very tame. On Rio Grande River west of Mesita in prairie dog town close to pump station. About 4 miles west of 14.

16. March 25, 1974. District Supervisor Keenan, Costilla creek. Observed ferret trench in old prairie dog town. About two miles SW of 13. Sign about a week old. Lots of small tracks. Trench started inside the hole and extended back about three feet. Trench about 5 to 6 inches across the top. Nearest prairie dogs 1/3 mile east. Prairie dog towns in this area about 3/4 killed out by ?.

17. July 2, 1974. With Howard Westbrook. Checking areas and prairie dog towns. A town south west of Mesita about 1 1/4 miles. About 15 acres on March 25. Now nearly gone. Ground squirrels and Kangeroo rats using holes. Prairie dogs sighted at extreme north end of town. Something has happened to prairie dogs on south end since March 25. Area 5 miles SE of 12 & 9. 1 mile NW of 13. 2 miles NE of 16. Plan to start night observation at this town.

FIGURE 3 -B (cont.)

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Ferret Sighting Progress

Since July, 115 hours has been spent in night observation of six different prairie dog towns. Those towns selected were in areas near where suspected ferrets or snow tracks had been observed or reported in the past.

Rabbits, deer mice, kangeroo rats, badgers, coyotes, owls, burros, horses, dogs and skunks have been observed with the spotlight at night. So far, five sightings of animals believed to be ferrets have been observed. This totals seven animals. Two prairie dog towns are involved about twenty five miles apart. Observations show that these are a very large weasel type animal. When first spotted w ith the light all have a very quick up and down weasel type movement. My estimate is that they raise up at least a foot high when making these movements. All seem to move around a couple of times very quickly, then settle down to watch as long as a timed thirty minutes. Eyes are a very brilliant green when turned toward the light and seem almost rectangular in one position. Badger eyes are about the same color or lighter but do not have the brilliance when looking at the light. The badger will run ten or fifteen feet and will turn and look. Two eyes can be seen close to the ground at all times.

The first sighting was on August 1. A 200 thousand candle power quartz light was used. This animal was observed out from 12:30 to 1 A.M. and again from 2:00 to 2:30 A.M. It kept the same position for a timed thirty minutes. It was about 250 yards away and could be picked up only with the use of the binoculars. At 6 A.M. two very good tracks could be seen on a kangeroo rat mound a few feet from the observation site. These tracks were slightly smaller than a quarter, round in shape, no claw marks, pads about the size of a pencil eraser tip. A light shower during the night made the tracking perfect. No pictures were taken of the tracks.

A holder w as made for the binoculars using two gun rack mounts, a piece of plywood and a metal mount with a swivel. This could be clipped to four or five inches of the rolled down widow glass on the pickup. The binoculars could be moved along with the light and any eyes could be readily picked up. On August 5 the same town was checked again and two animals were picked up about 300 yards north of the first sighting and about 200 yards away. They went through the same quick movements and settled down to look. The pickup was drove in a circular direction toward the animals to within about 100 yards. One of the animals could still be spotted in the brush. The truck was moved closer to get a better look. At this time a herd of about 20 horses

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passed directly through the area in front of the truck and the animals could not be located again. This town has been checked three times since with no results.

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The other prairie dog town is 25 miles west in the Little Mogote area. I would estimate the elevation close to 8500 feet here. An old reservoir bank sits in the middle of a town of approximately 80 acres of prairie dogs. This town was checked when the snow went off and twice before the night observations began. It seemed very obvious that the population was being reduced by something. This town is nine miles from any main road and is completly isolated. At the present time we would estimate that only 50% of the previous high population remains. Approximately 1/3 of the holes are completely covered either by gophers or rain. Some are being used by deer mice and kangeroo rats.

On August 7 this town was watched from 6:30 P.M. to 7:30 A.M. An area south of the reservoir was selected. An unusual prairie dog trench was observed here and about one acre of prairie dogs observed earlier was gone. At 9 P.M. a set of eyes was observed with the binoculars approaching the area about 200 steps away. This seemed a larger animal than those in the mesita town. It went through the same quick movements and settled down to watch the light for a timed 15 minutes. A brief view of the head was seen during his movements. A shadow was cast by the light at the same time making the head appear as large as a house cat. The outline of ears could be seen and appeared to be round.

The truck was moved about half way toward the area. At 1:30 A.M. within a few feet of the same spot three sets of eyes were spotted together on a mound. They stood for a moment together, then moved apart. Two dissapeared but one moved to a gresewood bush and watched the light for a timed five minutes.

On October 1, the same area was watched with spotlight and binoculars. At 8 P.M. after playing the light for about 7 or 8 minutes a set of eyes appeared on the reservoir bank by a greasewood bush to watch the truck and light in the moonlight. It was 120 steps away and seemed very curious. With very rapid movements it raised about half way up the greasewood bush twice and then out to the side. The bush at this point measured 30 inches high. The body outline could be seen for a brief moment. It settled in the sparse grass for about a minute. The grass here measured about 4 inches high. The top of the mid section of the body was plainly visible. The head was in the dark but the eyes could be seen to complete the outline. The rear end of the animal could not be seen. The front end appeared to be in a hole but daylight investigation showed no depression. The eyes showed the neck section to be

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three or four inches long. The saddle of the animal appeared dark but the side appeared to be a light buff color through the grass. The body appeared to be thirteen or so inches long.

It moved again to the bush and watched the truck and light for a timed five minutes before dissapearing. The area was walked with a red light but nothing could be found. Daylight investigation showed two very good tracks about a foot from the bush in the loose dirt of the reservoir bank. They were about the size of a quarter and slightly larger than the tracks seen in the Mesita town. Pictures were taken of the tracks.

This town was checked the nights of the 2 and 3rd but nothing showed.

About 23 hours of night work has been required for each sighting. I believe that all we need now to see the black mask to make the work official. I do not agree with the endangered part but the rare part is obvious. If these are not ferrets, we have a new and different animal that should be checked out.

Another observation, In order to make a good ferret investigator in this rock and brush pile, a mans head should be screwed on a little twisted and he should have a strong will power to resist the urge to cry at times.

Victor D. Keenan

GLOSSARY

Air Inversion--The trapping of a layer of cold air at the surface of the ground by a layer of warm air above it, preventing the normal rising of surface air. This condition continues until a wind reestablishes normal circulation or until the cold air is warmed by the land or sun.

Allochthonous--Originating elsewhere; not native to a place.

Allotment--An area of land where one or more operators graze their livestock. It generally consists of national resource lands but may include parcels of private or state owned lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures or be only one pasture.

Allotment Management Plan (AMP)--A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment.

Allottee--Holder of a license or permit for grazing on an allotment.

Animal Unit Month (AUM)--The amount of forage required to sustain the equivalent of one cow with one calf, or their equivalent, for one month.

Aquatic Community--An aggregate of aquatic organisms which form a distinct ecological unit. Such a unit would be defined in terms of plants and animals.

Aquifer--A water-bearing bed or stratum of permeable rock, sand or gravel capable of yielding considerable quantities of water.

Browse--As a verb, to consume, or feed or eat on (a plant); as a noun, the tender shoots, twigs, and leaves of trees and shrubs often used as food by cattle, deer, elk and other animals.

Carrying Capacity--In its true sense, the maximum number of individual animals that can survive the greatest period of stress each year on a given land area. It does not refer to sustained production.

Channel Erosion--Erosion occurring in the bottom of gullies or channels ranging from one foot to a hundred feet or more in depth.

Channel, First Order, Second Order, etc.--See Stream Order.

Channel Stability--A relative term describing a channel's condition with respect to erosion or movement of the channel walls or bottom due to water flows.

Class of Livestock--Kinds of domestic livestock grazing on a range--cattle, horses, sheep or goats, or a combination of these. May be broken down into greater detail such as cows with calves, yearlings, steers, ewes with lambs, etc.

Climax Vegetation--The final vegetative community which emerges after a series of successive vegetational stages and perpetuates itself indefinitely unless disturbed by outside forces.

Convective-Type Precipitation--Precipitation, usually rain or hail, resulting from convective storms. Convective storms are formed by localized heating of the lower layers of an air mass. As the heated air rises, it cools and forms a thundercloud. Convective-type storms are commonly called thunderstorms.

Cool-Season Plant--A plant which makes the major portion of its growth during late winter, early spring, and again in the fall (during the cool seasons).

Critical Wildlife Habitat--That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species either as individuals or as a population.

Deferred Grazing--Withholding of livestock grazing until a certain stage of plant growth is reached, usually maturity of seed.

Deferred Rest-Rotation Grazing--Rest-rotation grazing during fall and/or winter.

Deferred Rotation Grazing--Discontinuance of grazing on various parts of a range in succeeding years, allowing each part to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor. Two, but usually three or more, separate units are required. Control is usually insured by unit fencing, but may be obtained by camp unit herding.

Distribution--The uniformity of livestock grazing use over a range area. It is affected by water availability, topography, and type and palatability of vegetative species.

Ecosystem--An ecological community considered together with the non-living factors of its environment as a unit.

Endemic--Native to a particular area.

Environment--The surrounding conditions, influences or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Analysis Record (EAR)--A report analyzing the impacts of some proposed action on a given environment. It is similar to an environmental statement (ES) except that it is generally smaller in scope and makes recommendations for action. EARs are sometimes preliminary to ESs.

Ephemeral Flow--Flow occurring during rainstorms or at peak snowmelt time. Channels are not well defined and flow usually persists less than 10 percent of the year.

Epilimnion--The upper layer of warm water in a lake, containing more oxygen than the lower layers.

Eutrophication--The accumulation and retention of nutrients by aquatic ecosystems to the stage where vegetative decay exceeds the available oxygen supply.

Evapotranspiration--The total water loss from the soil, including that by direct evaporation and that by transpiration from the surfaces of plants.

Fauna--The animals of a particular period or region taken collectively.

Flow Velocity--The speed of water as it flows overland or in a channel. It is usually expressed in feet per second.

Forb--A broadleaved herb--a weed.

Frontal Precipitation--Precipitation associated with the leading edges (fronts) of relatively large air masses.

Grazing System--A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple-use goals or objectives by improving the quality and quantity of vegetation.

Green Period--When plants are green and growing.

Habitat--A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

High-Intensity Storms--Storms producing rainfall at rates exceeding the ability of the ground surface to absorb the water, thus resulting in the runoff of water. These storms are usually the convective, or thunderstorm, type.

Historic Resources--Sites, districts, structures, objects, or other evidences of human activities that represent facets of the history of the nation, state, or locality; places where significant historical or unusual events occurred even though no evidence of the event remains, or places associated with a personality important in history.

Hydraulic Distance--Defined as the distance between two points as traversed by a water flow patch. Often it is not a straight line.

Hydrologic Cycle--The transfer of water from land, plant, and ocean to the atmosphere and back.

Hydrologic Variables--The rates of evaporation, transpiration, and runoff are variable.

Hypolimnion--The lowermost, noncirculating layer of cold water in a thermally stratified lake, usually deficient in oxygen.

Infiltration--Water penetration into the soil through pores of the soil. Rate and amount of infiltration is limited by size and abundance of pores and water absorption capability of the soil.

Intensity of Use--Amount of vegetation consumed by grazing herbivores, usually measured as a percentage of the annual growth.

Intermittent Flow--Wet weather streamflow which persists less than 50 percent but not more than 10 percent of the year. With respect to water source, it may be classified as springflow fed or stormflow fed.

Invertebrate--An animal without a backbone. This group includes such animals as insects, clams, snails, and worms.

Isohyetal Map--Shows lines of mean annual precipitation based on climatological and hydrologic data correlated with topographic and physiographic factors.

Key Species--Forage species whose use serves as an indicator to the degree of use of associated species.

Kinetic Energy--That energy of a body which results from its motion.

Lease--An authorization permitting the use of national resource lands outside of a grazing district for the grazing of livestock during a specified period of time.

License--An authorization which permits the grazing of a specified number and class of livestock on a designated area of grazing district lands for a period of time, usually not in excess of one year.

Litter--Fresh undecomposed material of grass and forest lands.

Management Framework Plan (MFP)--Land use plan for national resource lands (NRL) which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Multiple Use--Harmonious and coordinated management of the various surface and subsurface resources, without impairment of the land, that will best meet the present and future needs of the people.

National Forest Lands--Public lands administered by the USDA Forest Service.

National Resource Lands (NRL)--Public lands administered by the Bureau of Land Management.

Off-Road Vehicle (ORV)--Any motorized vehicle for cross-country travel over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Orographic Lift--The lifting of an air mass that occurs as the mass passes over a topographic feature, such as a mountain range.

Overgrazing--Consumption of vegetation by herbivores beyond the endurance of a plant to survive.

Parent Material--The unconsolidated and more-or-less chemically weathered mineral or organic matter from which soil develops.

Pasture--As used in this document, a pasture is a subdivision of a grazing allotment on national resource lands. For example, the allotment is divided into three pastures.

Peak Discharge--The highest rate of water flow occurring in a channel during a given flow event, e.g., thunderstorm runoff, daily snowmelt runoff, seasonal snowmelt runoff, etc.

Pedestalling--A phenomenon of erosion where plants or rocks are left standing on pedestals of soil. Pedestals are formed because a rock or plant has held the soil underneath in place.

Percolation, Soil-Water--The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

Perennial Flow--Streamflow which persists at least 90 percent of the year in well-defined channels, usually fed in part by springflow.

Permit--An authorization which allows the grazing of a specified number and class of livestock on a designated area of grazing district lands during specified seasons each year for a period of usually 10 years.

Phreatophytes--Plants which habitually obtain their soil-water supply from the zone of saturation (groundwater).

Plant Vigor--The relative well being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance.

Range Condition and Trend--A description of the current status and estimated future improvement or deterioration of the vegetation and soil.

Range Improvement--A structure, action or practice that increases forage production, improves watershed and range condition, or facilitates management of the range or the livestock grazing thereon.

Relict--As related to climax, fragments of presently existing flora in areas with a historical record of no disturbance and with the plant community assumed to be in near virgin condition.

Renewable Resources--Living resources that are able to reproduce or replace themselves and to increase.

Rest--As used in this statement, deferment of grazing on a range area to allow plants to replenish their food reserves.

Rest Rotation Grazing--An intensive system of management whereby grazing is deferred on various parts of the range during succeeding years, allowing the deferred part complete rest for one year. Two or more units are required. Control by fencing is usually necessary on cattle range, but may be obtained by herding on sheep ranges.

Rill Erosion--Erosion in which numerous small channels of only several inches in depth are formed.

Riparian--Situated on or pertaining to the bank of a river, stream, or other body of water. Normally this is used to refer to the plants of all types that grow along streams, around springs, etc.

Rotation--A grazing system providing for sequential movement of livestock from one pasture to another to allow for regrowth of vegetation and maintenance of vegetative vigor.

Season-Long Grazing--Summer-long grazing without rest periods.

Season of Use--The time of livestock grazing on a range area based on type of vegetation or stage of vegetative growth.

Sediment--The relatively fine material that settles to the bottom of a waterway. Material less than three millimeters in diameter is of particular concern because of its adverse effects on aquatic life.

Sediment Yield--The amount of sediment given up by a watershed over a specified time period, usually a year. Ordinarily, it is expressed as tons, acre feet, or cubic yards of sediment per unit of drainage area per year.

Seedlings--Young plants.

Seed-Ripe State--When seed is mature, usually late summer and early fall.

Sheet Erosion--The removal of a layer of soil from land surface by water.

Soil Association--A group of defined and named taxonomic soil units occurring together in individual and characteristic patterns over a geographic region. It is comparable to plant associations in many ways.

Stream Order--(First order, second order, third order, etc.) A dimensionless number system introduced by Horton (1945) to quantify the branching hierarchy of stream networks. Assuming that one has available a channel network map including all intermittent and permanent flow lines located in clearly defined valleys, the smallest fingertip tributaries are designated order 1. Where two or more first order channels join, a channel segment of order 2 is formed. Where two segments of order 2 join, a segment of order 3 is formed, and so forth.

Unit Resource Analysis--The system of data gathering and analysis that precedes land use planning for national resource lands. See Management Framework Plan.

Utilization--The proportion of current year's forage production that is consumed or destroyed by grazing animals. It is usually expressed as percentage.

Vascular Plants--Tracheophyte; plants having specialized tissues (xylem and phloem) that conduct water and synthesized foods.

Vegetative Type--A plant community with distinguishable characteristics.

Vertebrate--All animals having a segmented spinal column.

Visual Resources--The land, water, vegetation, animals and other features that are visible on all national resource lands.

Watershed--The area drained by a river or river system.

Wetted Perimeter--The outer boundary of soil moisture in the wetting zone. This boundary is between the moistened soil and dry soil.

Wilting Point--The moisture content of soil at which plants wilt and fail to recover.

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(June 1984)

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Draft environmental
statement on grazi

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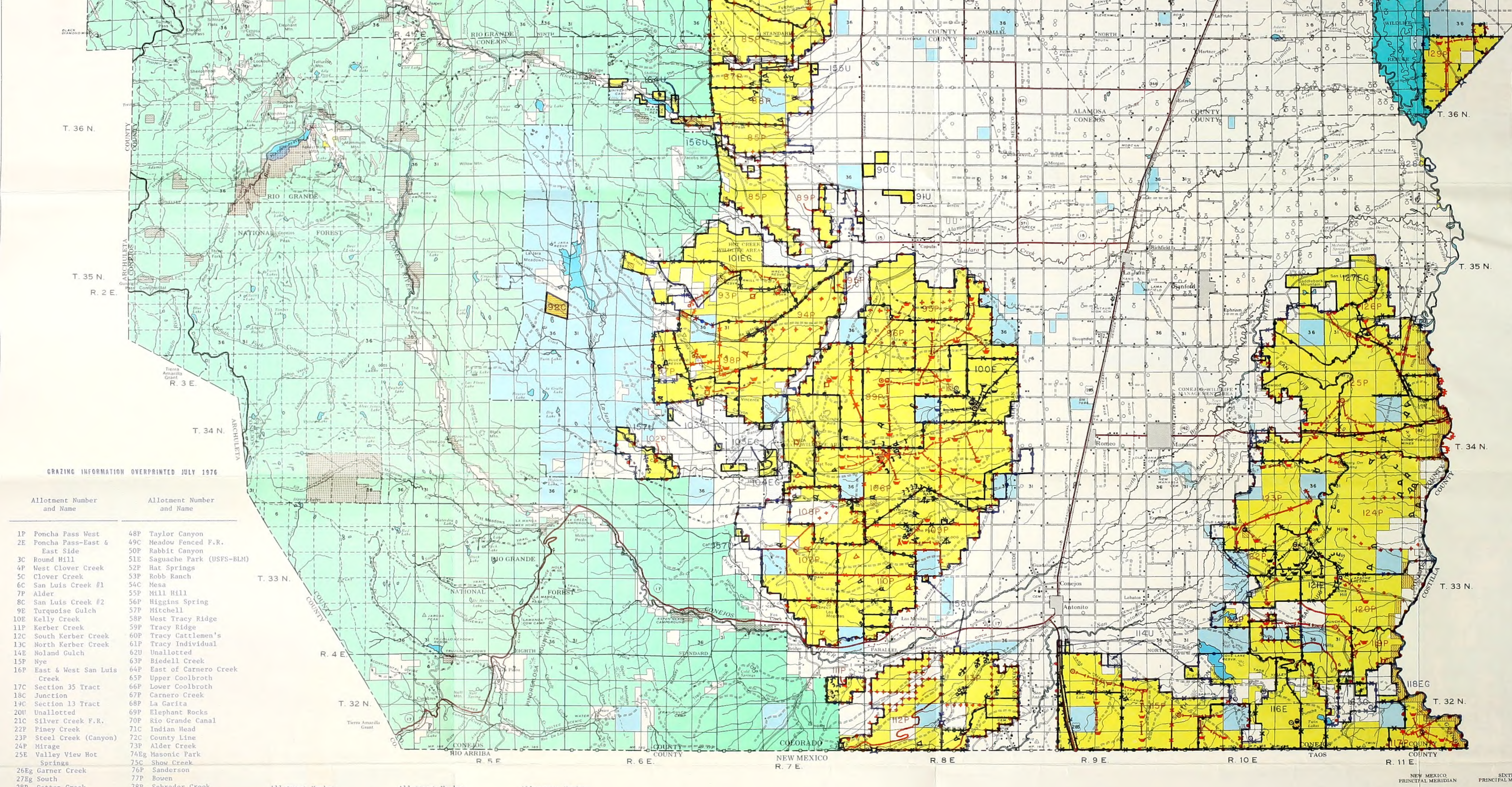
Denver Service Center

Errata (Figure I-2)

101Eg	Should be 101U.
114U	Includes 160 acres which have been transferred out of federal ownership since units boundaries were prepared.
141P	Unit number is located out of place--should be on east side of fence.
149U	Does not appear on map. Includes part of Section 21, T. 29 S., R. 73 W.
161C	Includes all parcels of NRL within fenced boundary.

R. 3 E.
R. 3½ E.
R. 4 E.
R. 4½ E.
R. 5 E.
R. 6 E.
R. 7 E.
R. 8 E.
R. 9 E.
R. 10 E.
R. 11 E.
R. 12 E.
R. 13 E.
R. 73 W.
NEW MEXICO PRINCIPAL MERIDIAN
SIXTH PRINCIPAL MERIDIAN
T. 39 N.
T. 38 N.
T. 37 N.
T. 36 N.
T. 35 N.
T. 28 S.
T. 29 S.
R. 2 E.
R. 4½ E.
R. 5½ E.
MINERAL
RIO GRANDE
COUNTY
ARCHULETA
CONEJOS
RIO GRANDE
NATIONAL
FOREST
RIO GRANDE
CONEJOS
Monte Vista
Alamosa
La Jara
Sanford
Manassa
MONTE VISTA NATIONAL WILDLIFE REFUGE
ALAMOSA NATIONAL WILDLIFE REFUGE
ALAMOSA
CONEJOS
ALAMOSA
COSTILLA
HUERFANO CO.
HOT CREEK WILDLIFE AREA
RIO GRANDE REARING UNIT
Tierra Amarilla Grant
80P
81P
83P
84P
85P
86P
87P
88P
89P
90C
91U
92C
93P
94P
95P
96P
98P
100E
101EC
125P
127EC
128P
129P
130C
131U
132P
133P
135C
136C
138P
139C
140EC
141P
150C
155U
156U
MAP SYMBOLS
Feature
Symbol
District Bdy
Nat'l or State
Continental Divide
County
Land Grant
Miscellaneous (Res., etc.)
Park (State, County or Local)
Township and Range
Surveyed
Protracted
Section
Surveyed
Protracted
Sec., Status Subdivision
Section Identification
State Plane Coordinates And Zone
1,500,000E
Boundary Monument
Route Marker Interstate
Route Marker U.S.
Route Marker State
Road All Weather
Divided
Road Seasonal Use
Road "Jeep" Type "Primitive"
Trail
Railroad Double Track
Railroad Single Track
Glacier
Road Bridge
Railroad Bridge
Foot Bridge
Ferry
Road Ford
Trail Ford
Road Tunnel
Railroad Tunnel
Prominent Peak
Principal Access
Divided
Road Interchange
Rest Area
Levee or Dike
Corral
Recreation Site
Tanks-(label as to type)
Oil or Gas Wells
Mine or Quarry
US Mineral or Location Monument
Located Object (Labeled)
Triangulation Station
Dog
Bluffs or Cliffs
Prominent Ridge
Buildings
Buildings (Abandoned)
BLM Office
School
Church
Radio Installation
Fire Lookout (Primary)
Fire Lookout (Secondary)
Fire Tool Cache
Shelter
Cliff Dwelling
Ruins
Small
Large
Ruins
Ruins
Cemetery
CEM
Sawmill
Airfield
Gaging Station
Towns and Cities
River or Large Stream
Stream
Large Dam
Reservoir or Retention Dam
Lake or Pond
Intermittent Lake or Pond
Dry Lake or Pond
Marsh
Spring
Improved Spring
Well
Artesian Well
Windmill
Aqueduct Tunnel
Ditch or Canal
Aqueduct



GRAZING INFORMATION OVERPRINTED JULY 1976

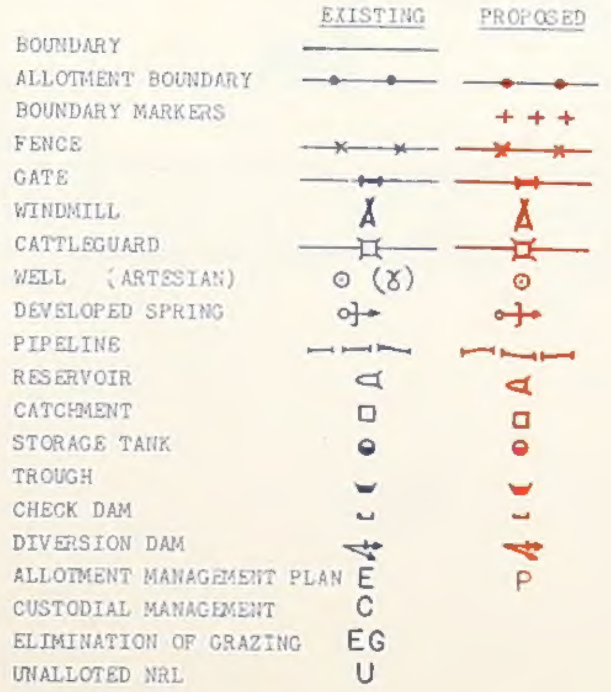
Allotment Number and Name	
1P	Poncha Pass West
2E	Poncha Pass-East & East Side
3C	Round Hill
4P	West Clover Creek
5C	Clover Creek
6C	San Luis Creek #1
7P	Alder
8C	San Luis Creek #2
9E	Turquoise Gulch
10E	Kelly Creek
11P	Kerber Creek
12C	South Kerber Creek
13C	North Kerber Creek
14E	Noland Gulch
15P	Nye
16P	East & West San Luis Creek
17C	Section 35 Tract
18C	Junction
19C	Section 13 Tract
20U	Unallotted
21C	Silver Creek F.R.
22P	Piney Creek
23P	Steel Creek (Canyon)
24P	Mirage
25E	Valley View Hot Springs
26Eg	Garner Creek
27Eg	South
28P	Cotton Creek
29C	Noland Gulch
30C	South Kerber Creek
31P	Hutchinson
32U	Unallotted
33U	Unallotted
34P	Mineral Hot Springs
35U	Unallotted
36P	McIntyre Gulch
37U	Unallotted
38U	Unallotted
39P	Findley Gulch
40C	Calvert Fenced F.R.
41P	Laughlin Gulch
42P	Poison Gulch
43C	Ward Fenced Tracts
44C	Indian Creek
45P	Cross Creek
46P	Trickle Mountain
47P	Sheep Creek

Allotment Number and Name	
48P	Taylor Canyon
49C	Meadow Fenced F.R.
50P	Rabbit Canyon
51E	Saguache Park (USFS-BLM)
52P	Hat Springs
53P	Robb Ranch
54C	Mesa
55P	Mill Hill
56P	Higgins Spring
57P	Mitchell
58P	West Tracy Ridge
59P	Tracy Ridge
60P	Tracy Cattlemen's
61P	Tracy Individual
62U	Unallotted
63P	Biedell Creek
64P	East of Carnero Creek
65P	Upper Coolbroth
66P	Lower Coolbroth
67P	Carnero Creek
68P	La Garita
69P	Elephant Rocks
70P	Rio Grande Canal
71C	Indian Head
72C	County Line
73P	Alder Creek
74Eg	Masonic Park
75C	Show Creek
76P	Sanderson
77P	Bowen
78P	Schrader Creek
79P	Branch
80P	Pup Peak
81P	Limekiln
82P	Nicomodes
83P	Raton Creek
84P	Rock Creek
85P	McMahon
86P	Greenie Mountain
87P	Gato-hutchinson
88P	Triangle
89P	Alamosa River
90C	Alamosa Prairie
91U	Unallotted
92C	Chicago Bogs
93P	Posito Creek
94P	Jadero Flat
95P	Poso Creek
96P	Capulin
97P	Romero Canyon

Allotment Number and Name	
98P	Ra Jadero Canyon
99P	Cinder Pits
100E	Ciscom Flat
101U	Hot Creek
102P	La Jara Creek
103C	Del Rancho
104Eg	La Jara Canyon
105Eg	Pastures
106P	Little Mogotes
107P	Grande
108P	Mogote Flat
109P	Poso
110P	Los Mogotes
111P	Big Horn (Creek)
112P	Railroad
113P	Llano
114U	Unallotted
115P	Alta Lake
116E	Twin Lakes
117P	River
118Eg	Mondragon Individual
119P	South Valley
120P	Pinon

Allotment Number and Name	
121E	Kiowa Hill
122P	Braiden
123P	Eight Mile
124P	Pinon Hills
125P	Rio Grande Common
126P	La Sauses
127Eg	Saddleback Mountain
128C	Oxbow
129P	Rio Grande
130C	Allotment B
131U	Emperius
132P	Four Mile
133P	Tobin Creek
134P	Foothills
135C	Dow Pasture
136C	Phiffer Pasture
137P	Blanca Allotment (WHA)
138P	Dry Lakes
139C	Caldwell Pasture
140Eg	Park Pasture
141P	Zapata Falls
142C	Bachelor Lake
143C	Spring Pasture

Allotment Number and Name	
144C	Sand Pasture
145C	Crow Pasture
146C	Section 15 Lease
147C	Section 15 Lease
148Eg	North Pasture (current use included in 141P)
149U	Unallotted
150C	Dry Lakes
151U	Unallotted
152U	Unallotted
153U	Unallotted
154U	Unallotted
155U	Unallotted
156U	Unallotted
157U	Unallotted
158U	Unallotted
159E	Klondyke (USFS-BLM)
160C	Phone Line
161C	Big East
162C	Hellgate
163C	Sheep Trail
164U	Terrace Lakes
165U	Bonanza



	EXISTING	PROPOSED
BOUNDARY		
ALLOTMENT BOUNDARY		
BOUNDARY MARKERS		+ + +
FENCE		
GATE		
WINDMILL		
CATTLEGUARD		
WELL (ARTESIAN)	(ɣ)	
DEVELOPED SPRING		
PIPELINE		
RESERVOIR		
CATCHMENT		
STORAGE TANK		
TROUGH		
CHECK DAM		
DIVERSION DAM		
ALLOTMENT MANAGEMENT PLAN	E	P
CUSTODIAL MANAGEMENT	C	
ELIMINATION OF GRAZING	EG	
UNALLOTED NRL	U	

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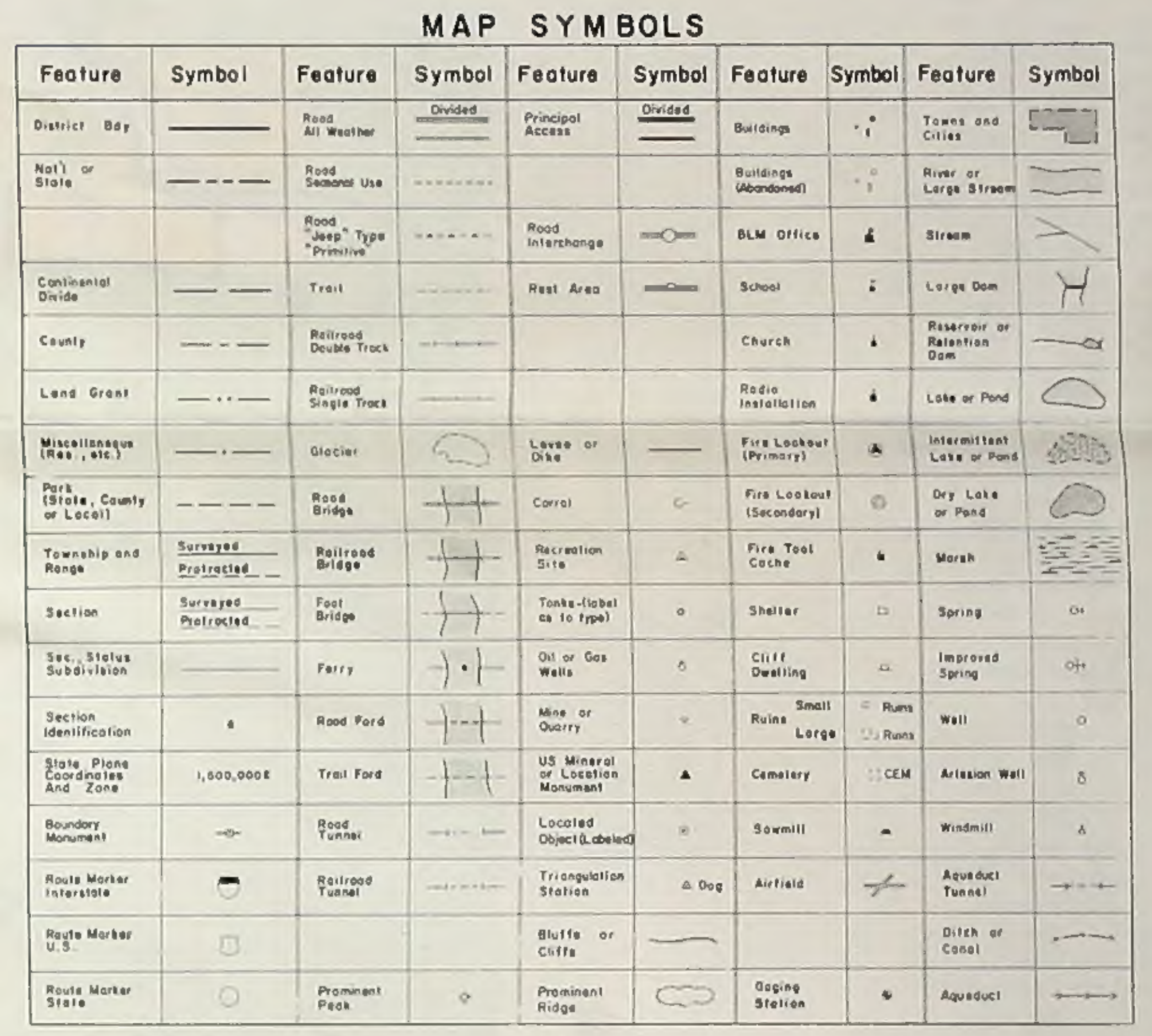
MAPS COMPILED IN 1976 FROM INTERMEDIATE SCALE QUADRANGLES 1974– 1976 NOT FIELD EDITED

SCALE

1 ½ 0 1 2 3 4 5 MI

MAP SYMBOLS



Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol
District Bdy		Road All Weather	Divided	Principal Access	Divided	Buildings		Towns and Cities	
Nat'l or State		Road Seasonal Use				Buildings (Abandoned)		River or Large Stream	
		Road "Jeep" Type "Primitive"		Road Interchange		BLM Office		Stream	
Continental Divide		Trail		Rest Area		School		Large Dam	
County		Railroad Double Track				Church		Reservoir or Retention Dam	
Land Grant		Railroad Single Track				Radio Installation		Lake or Pond	
Miscellaneous (Res., etc.)		Glacier		Levee or Dike		Fire Lookout (Primary)		Intermittent Lake or Pond	
Park (State, County or Local)		Road Bridge		Corral		Fire Lookout (Secondary)		Dry Lake or Pond	
Township and Range	Surveyed Protracted	Railroad Bridge		Recreation Site		Fire Tool Cache		Marsh	
Section	Surveyed Protracted	Foot Bridge		Tanks-(label as to type)		Shelter		Spring	
Sec., Status Subdivision		Ferry		Oil or Gas Wells		Cliff Dwelling		Improved Spring	
Section Identification		Road Ford		Mine or Quarry		Ruins Small Large	Ruins Ruins	Well	
State Plane Coordinates And Zone	1,000,000 E	Trail Ford		US Mineral or Location Monument	▲	Cemetery	CEM	Artesian Well	
Boundary Monument		Road Tunnel		Located Object (Labeled)		Sawmill		Windmill	
Route Marker Interstate		Railroad Tunnel		Triangulation Station	△ Dog	Airfield		Aqueduct Tunnel	
Route Marker U.S.				Bluffs or Cliffs				Ditch or Canal	
Route Marker State		Prominent Peak		Prominent Ridge		Gaging Station		Aqueduct	

LAND STATUS LEGEND

National Resource Lands	🟨
Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR)	☐
National Forest	🟩
National Grasslands	☐
National Parks and Monuments	☐
Indian Lands or Reservations	☐
Military Reservations and Withdrawals Corps of Engineers	☐
Wildlife Refuges	🟦
Bankhead-Jones Land Use Lands (L.U. Lands)	☐
Tennessee Valley Authority	☐
Patented Lands	☐
State Lands	🟦
Bureau of Reclamation	▨
Power Withdrawals and Classifications	▨
Federal Agency Protective Withdrawals	▨
Public Water Reserves	▨
Energy Research and Development Administration (ERDA)	☐
Oregon & California Lands (O&C Lands Administered By US Forest Service	☐
Radio & Air Facilities	☐
Miscellaneous	☐
*State Wildlife, Park and Outdoor Recreation Areas	☐
Acquired Lands (By Administering Agency)	☐

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SAN LUIS RESOURCE AREA

SOUTH HALF

COLORADO
1976

GRAZING INFORMATION OVERPRINTED JULY 1976

Allotment Number and Name

1P Poncha Pass West
2E Poncha Pass-East & East Side
3C Round Hill
4P West Clover Creek
5C Clover Creek
6C San Luis Creek #1
7P Alder
8C San Luis Creek #2
9E Turquoise Gulch
10E Kelly Creek
11P Kerber Creek
12C South Kerber Creek
13C North Kerber Creek
14E Noland Gulch
15P Nye
16P East & West San Luis Creek
17C Section 35 Tract
18C Junction
19C Section 13 Tract
20U Unallotted
21C Silver Creek F.R.
22P Piney Creek
23P Steel Creek (Canyon)
24P Mirage
25E Valley View Hot Springs
26Eg Garner Creek
27Eg South
28P Cotton Creek
29C Noland Gulch
30C South Kerber Creek
31P Hutchinson
32U Unallotted
33U Unallotted
34P Mineral Hot Springs
35U Unallotted
36P McIntyre Gulch
37U Unallotted
38U Unallotted
39P Findley Gulch
40C Calvert Fenced F.R.
41P Laughlin Gulch
42P Poison Gulch
43C Ward Fenced Tracts
44C Indian Creek
45P Cross Creek
46P Trickle Mountain
47P Sheep Creek
48P Taylor Canyon
49C Meadow Fenced F.R.
50P Rabbit Canyon
51E Saguache Park (USFS-BLM)
52P Hat Springs
53P Robb Ranch
54C Mesa
55P Mill Hill
56P Higgins Spring
57P Mitchell
58P West Tracy Ridge
59P Tracy Ridge
60P Tracy Cattlemen's
61P Tracy Individual
62U Unallotted
63P Biedell Creek
64P East of Carnero Creek
65P Upper Coolbroth
66P Lower Coolbroth
67P Carnero Creek
68P La Garita
69P Elephant Rocks
70P Rio Grande Canal
71C Indian Head
72C County Line
73P Alder Creek
74Eg Masonic Park
75C Show Creek
76P Sanderson
77P Bowen
78P Schrader Creek
79P Branch
80P Pup Peak
81P Limekiln
82P Nicomodes
83P Raton Creek
84P Rock Creek
85P McMahon
86P Greenie Mountain
87P Gato-hutchinson
88P Triangle
89P Alamosa River
90C Alamosa Prairie
91U Unallotted
92C Chicago Bogs
93P Posito Creek
94P Jadero Flat
95P Poso Creek
96P Capulin
97P Romero Canyon
98P Ra Jadero Canyon
99P Cinder Pits
100E Ciscom Flat
101U Hot Creek
102P La Jara Creek
103C Del Rancho
104Eg La Jara Canyon
105Eg Pastures
106P Little Mogotes
107P Grande
108P Mogote Flat
109P Poso
110P Los Mogotes
111P Big Horn (Creek)
112P Railroad
113P Llano
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115P Alta Lake
116E Twin Lakes

Allotment Number and Name

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127Eg Saddleback Mountain
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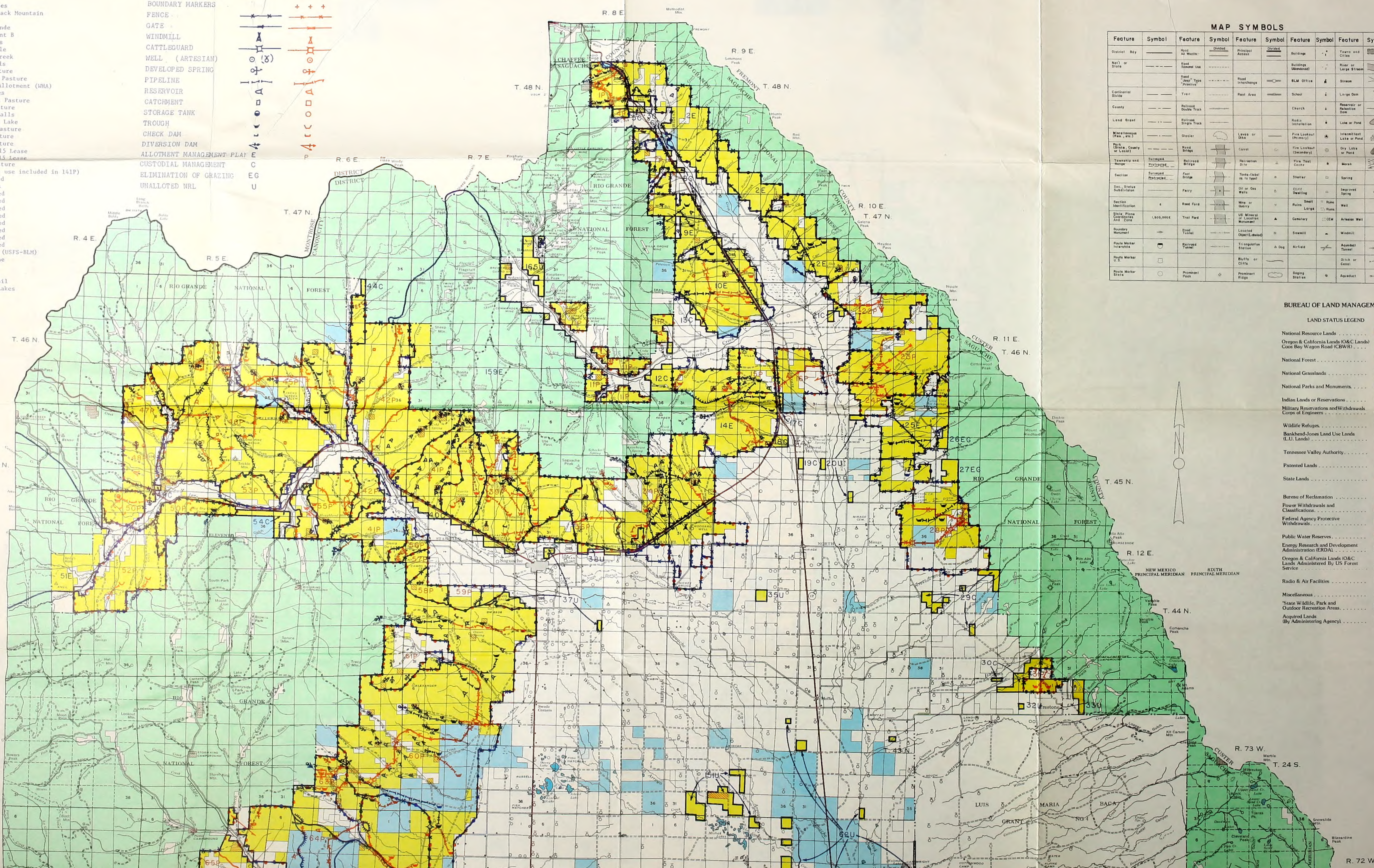
	EXISTING	PROPOSED
BOUNDARY	—	—
ALLOTMENT BOUNDARY		
BOUNDARY MARKERS		+ + +
FENCE		
GATE		
WINDMILL		
CATTLEGUARD		
WELL (ARTESIAN)	⊙ (ɣ)	⊙
DEVELOPED SPRING		
PIPELINE		
RESERVOIR		
CATCHMENT	□	□
STORAGE TANK	●	○
TROUGH		
CHECK DAM		
DIVERSION DAM		
ALLOTMENT MANAGEMENT PLAN	E	P
CUSTODIAL MANAGEMENT	C	
ELIMINATION OF GRAZING	EG	
UNALLOTED NRL	U	



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Route Marker State		Prominent Peak		Prominent Ridge		Gaging Station		Aqueduct	

BUREAU OF LAND MANAGEMENT

LAND STATUS LEGEND

National Resource Lands	🟨
Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR)	☐
National Forest	🟩
National Grasslands	☐
National Parks and Monuments	🟪
Indian Lands or Reservations	☐
Military Reservations and Withdrawals Corps of Engineers	☐
Wildlife Refuges	☐
Bankhead-Jones Land Use Lands (L.U. Lands)	☐
Tennessee Valley Authority	☐
Patented Lands	☐
State Lands	🟦
Bureau of Reclamation	▨
Power Withdrawals and Classifications	▨
Federal Agency Protective Withdrawals	▨
Public Water Reserves	▨
Energy Research and Development Administration (ERDA)	☐
Oregon & California Lands (O&C Lands Administered By US Forest Service	☐
Radio & Air Facilities	☐
Miscellaneous	☐
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Acquired Lands (By Administering Agency)	☐

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61P Tracy Individual
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120P Pinon
121E Kiowa Hill
122P Braiden
123P Eight Mile
124P Pinon Hills
125P Rio Grande Common

State Lands . . . . 🟦

Bureau of Reclamation . . . . ▦

Power Withdrawals and Classifications. . . . . ▥

Federal Agency Protective Withdrawals. . . . . ▤

Public Water Reserves. . . . . ▨

Energy Research and Development Administration (ERDA) . . . . ☐

Oregon & California Lands (O&C Lands Administered By US Forest Service . . . . ☐

Radio & Air Facilities . . . . ☐

Miscellaneous . . . . ☐

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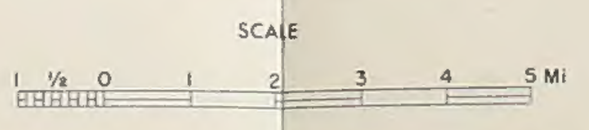

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SAN LUIS RESOURCE AREA
NORTH HALF

COLORADO
1976

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